2005 Data Summary
Missouri Nutrition Surveillance System

Pediatric Nutrition Surveillance

Missouri Department of Health and Senior Services

PREFACE

This document summarizes selected key pediatric health indicators of infants and children, age from birth to 5 years, participating in the Missouri WIC Program in 2005, which contributed to the Missouri Pediatric Nutrition Surveillance System in 2005.

Missouri Department of Health and Senior Services

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EXECUTIVE SUMMARY

The Pediatric Nutrition Surveillance System (PedNSS) is a national surveillance system created and maintained by the Centers for Disease Control and Prevention (CDC). The purpose of this system is to monitor the growth status of children of low-income families in federally funded maternal and child health programs. In 2005, the Missouri PedNSS was composed of data collected exclusively from infants and children participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Thus, this report describes the growth status of children from low-income families in Missouri from birth up to the fifth birthday during the calendar year 2005. The data on growth (birthweight, short stature, underweight, overweight) and anemia (low hemoglobin/hematocrit) status of infants and children, and the breastfeeding practices of their mothers were collected in WIC clinics, analyzed by CDC, and used in this report.

Low and High Birthweight

Low birthweight is the single most important factor affecting neonatal mortality and is a determinant of post-neonatal mortality. In Missouri, very minimal improvements in low birthweight have been observed in the PedNSS population from 1996 to 2005. In 2005, low birthweight remained an area of greatest concern for the Non-Hispanic Black racial and ethnic group, because it affected almost every seventh infant in this group. However, the prevalence of high birthweight has been slightly decreasing since 1996; it was 6.7% in 2005. American Indian/Alaskan Native, Hispanic, and Non-Hispanic White groups had relatively higher proportions of being born overweight.

Short Stature

Short stature is an indication of chronic malnutrition. The Missouri PedNSS rates for short stature have had a small fluctuation from 1996 to 2005. The highest prevalence of this pediatric health indicator was shared among Non-Hispanic Black, Non-Hispanic White, and Asian/Pacific Islander race/ethnicities in 2005. The rates in short stature decreased with the age of the infants and children in 2005.

Underweight

Weight and height were measured to assess the growth status of children participating in the WIC program. In Missouri, the prevalence of underweight has been slightly declining from 1996 to 2005. The highest prevalence was in Non-Hispanic Black infants and children. Infants (under 12 months of age) were more likely to be underweight compared to the other age groups.

Overweight (Birth to 5 Years)

The rate in overweight of infants and children (birth to 5 years) who participated in Missouri PedNSS had been increasing during the previous years, but declined slightly for the first time in 2005. American Indian/Alaskan Native and Hispanic infants and children had higher rates of being overweight, while Non-Hispanic Black infants and children had lower rates of being overweight. The proportion of overweight infants and children fluctuated with age – the 12-23 months age group showed the highest rate of overweight in 2005.

Overweight and At Risk for Overweight (2 to 5 Years)

Over the last 10 years, the rate of at risk for overweight has been increasing among Missouri's PedNSS children, age 2 to 5 years. However, the rate of being overweight for this group of children decreased slightly for the first time in 2005. In the Missouri 2005 PedNSS, the highest rates of being overweight and at risk for overweight were among Hispanic children. The proportions of children who were overweight and at risk for overweight increased with age.

Anemia (Low Hemoglobin/Hematocrit)

In Missouri, the prevalence of anemia (low hemoglobin/ hematocrit) decreased from 19.7% in 1996 to 16.2% in 2003, but has increased since then to 17.5% in 2005. Approximately one fourth of the Non-Hispanic Black PedNSS infants and children in 2005 had low hemoglobin/hematocrit.

Breastfeeding Initiation

The percent of women initiating breastfeeding in Missouri's WIC program has been increasing over the last 10 years. The Non-Hispanic Black infants had the lowest rate of being ever breastfed.

INTRODUCTION

The Pediatric Nutrition Surveillance System (PedNSS) is a child-based public health surveillance system that monitors the growth status of nutritionally at-risk children in low-income families[1] who participate in federally funded maternal and child health programs. The goal of PedNSS is to collect, analyze, and distribute surveillance data to assist in planning public health nutrition interventions.

In 2005, the Missouri PedNSS represented infants and children who were enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Data were collected for infants and children up to the fifth birthday, who visited WIC clinics for routine care and nutrition services, including nutrition education and supplemental food. In 2005, the data included demographic information (race/ethnicity and age of the participants), birthweight (low birthweight, high birthweight), growth (short stature, underweight, overweight, at risk for overweight), anemia (low hemoglobin/hematocrit), and breastfeeding initiation.

This report summarizes 2005 PedNSS data, highlights trends on key indicators from 1996 through 2005, monitors the Healthy People 2010 Objectives, and compares Missouri PedNSS with the national PedNSS on selected indicators.

In 2005, the Missouri PedNSS reflected 177,522 records on 139,167 infants and children less than 5 years of age. There were 23,125 infants and children from Jackson County. St. Louis City was represented by 14,600 infants and children who participated in WIC in 2005, and 8,276 infants and children from St. Louis County were included in the analysis. The largest number of records contributed from one clinic was from the Springfield-Greene County WIC agency that collected data on 6,375 infants and children.

Limitations of the Pediatric Nutrition Surveillance System

The PedNSS was established to monitor the health status of low-income infants and children. In Missouri, only the WIC program contributed to the PedNSS; therefore, the Missouri PedNSS does not represent all low-income infants and children. Also, care must be taken when comparing PedNSS among states and the national PedNSS, as the demographic composition differs among the WIC populations in the various states. Plus, the PedNSS population in some states includes children in low income families from other programs in addition to WIC. However, PedNSS is a unique data set. It is the largest, most diverse (racially, ethnically, and geographically) data set available on infants and children from low-income families. The contribution of only WIC data to the PedNSS in Missouri[2] allows easier application of the conclusions and recommendations to WIC participants from birth to 5 years of age. Thus, it helps determine risk factors to assist in planning interventions to decrease infant mortality and nutrition-related health problems among the state's WIC participants.

[1] Potential WIC participants may have a household income up to 185% of the federal poverty level. However, participation in other health, social service or MC+ programs may allow for WIC participation at even higher income levels. Please see the 2007 HHS Poverty Guidelines on the website: http://aspe.hhs.gov/poverty/07poverty.shtml.

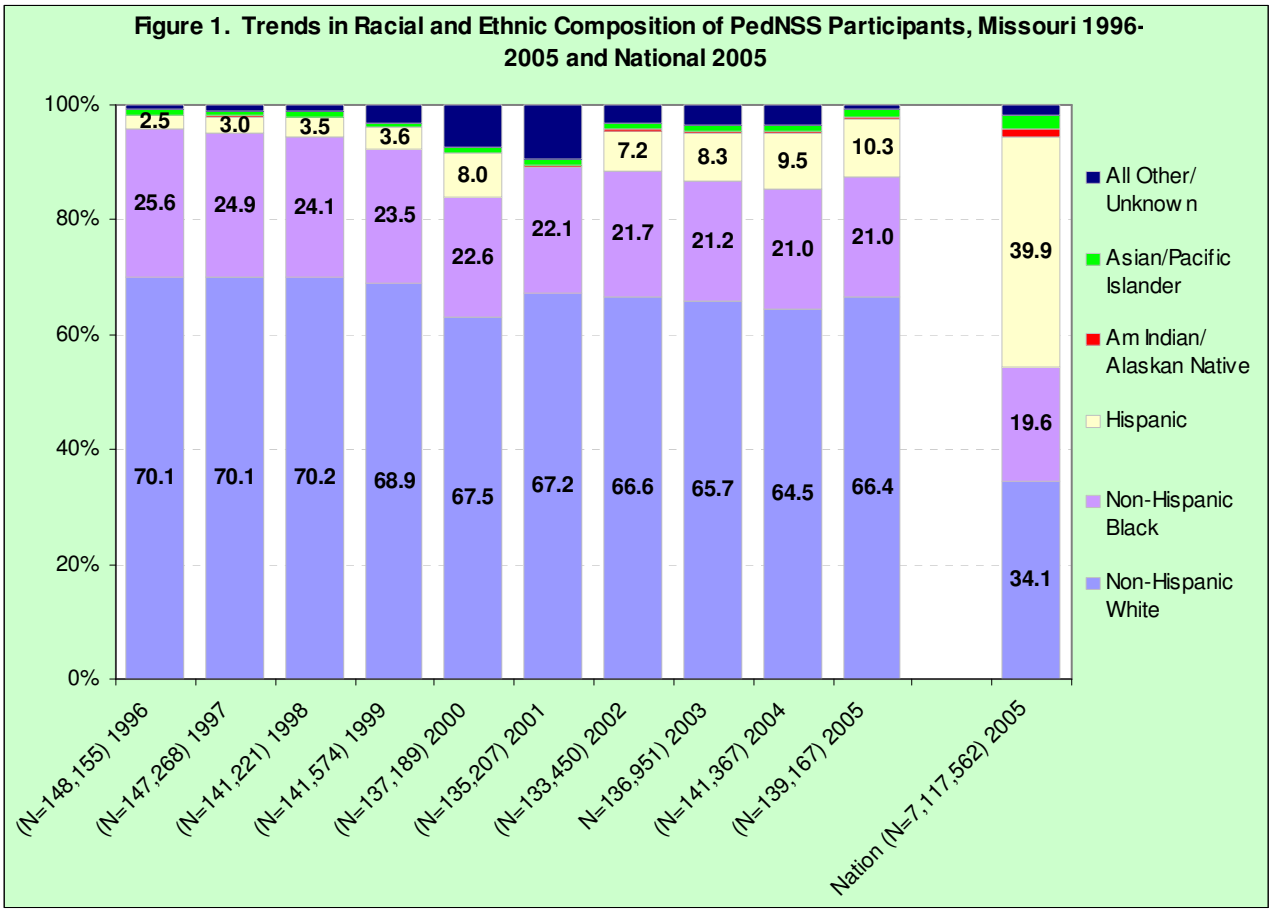
[2] In Missouri, WIC is the only program that contributes data to the national PedNSS. In 2005, 85.8% of the national PedNSS records were contributed by WIC programs of participating states. Other records were contributed by programs of Child Health-HMO (10.1%), EPSDT (Early Periodic Screening, Diagnosis, and Treatment) (3.8%), and Child Health-MCH (0.3%).

DEMOGRAPHIC CHARACTERISTICS

Demographic information, such as race/ethnicity and age, was associated with differences in birth outcomes, greater health risks and poor growth status of infants and children. The impact of these characteristics on key pediatric health indicators will be discussed throughout this report.

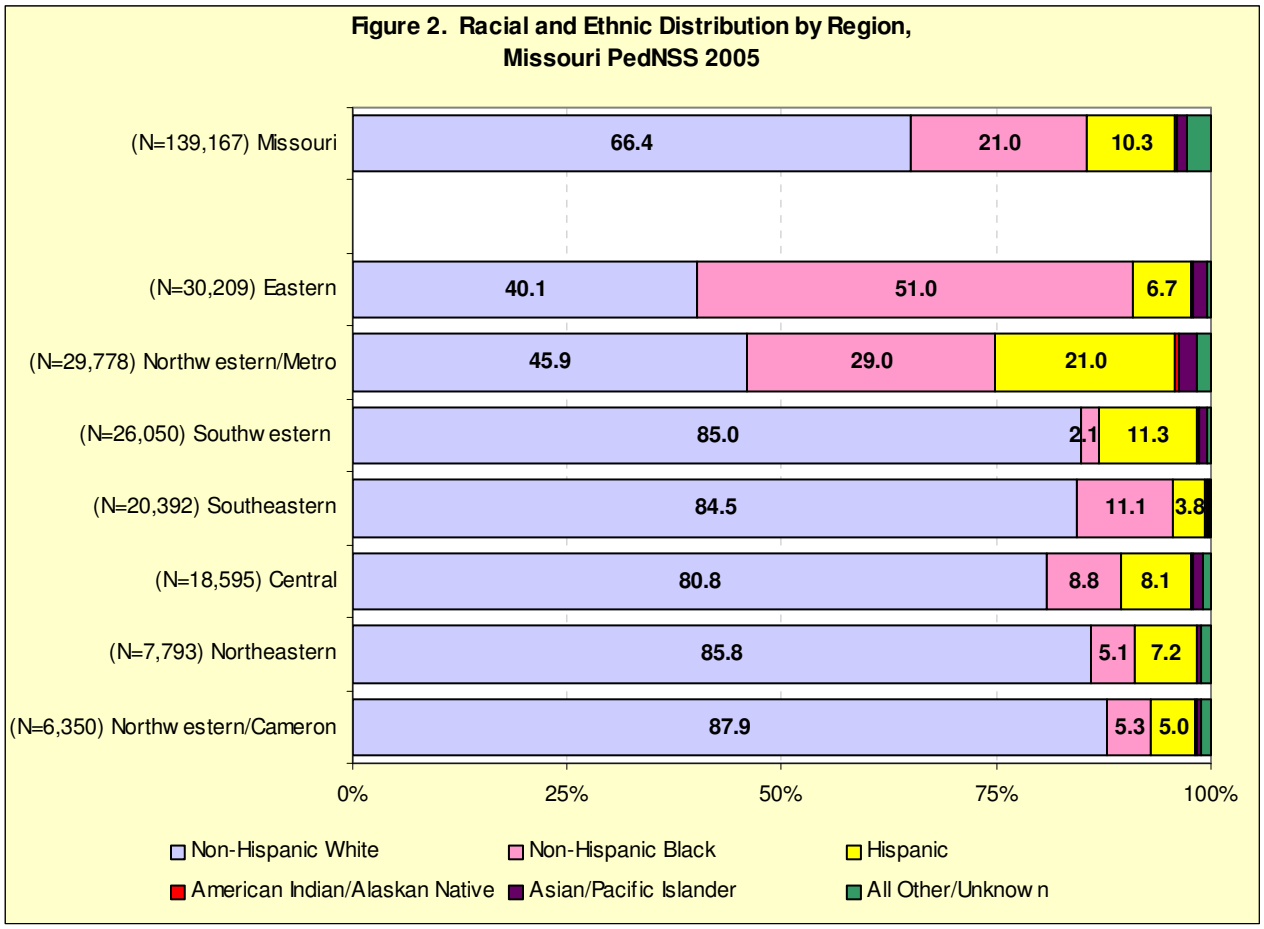
Race/Ethnicity

In the Missouri 2005 PedNSS, 66.4% of all children that participated were Non-Hispanic White, 21.0% were Non-Hispanic Black, 10.3% were Hispanic, 0.3% were American Indian/Alaskan Native, and 1.2% were Asian/Pacific Islander. Racial and ethnic composition of PedNSS participants has been changing over the last 10 years (Figure 1). The proportion of Hispanic children has been increasing from 2.5% in 1996 to 10.3% in 2005. Compared to the National PedNSS, the Missouri PedNSS proportions of Hispanic (10.3% in Missouri and 39.9% in the nation) and Asian/Pacific Islander children (1.2% and 2.7%, respectively) were smaller, while the proportions of Non-Hispanic White and Non-Hispanic Black children were larger.



Note: The percentages for only the large racial and ethnic groups were shown on Figure 1. In 2001, the proportion of infants and children of Hispanic ethnicity remained unknown due to a definition change.

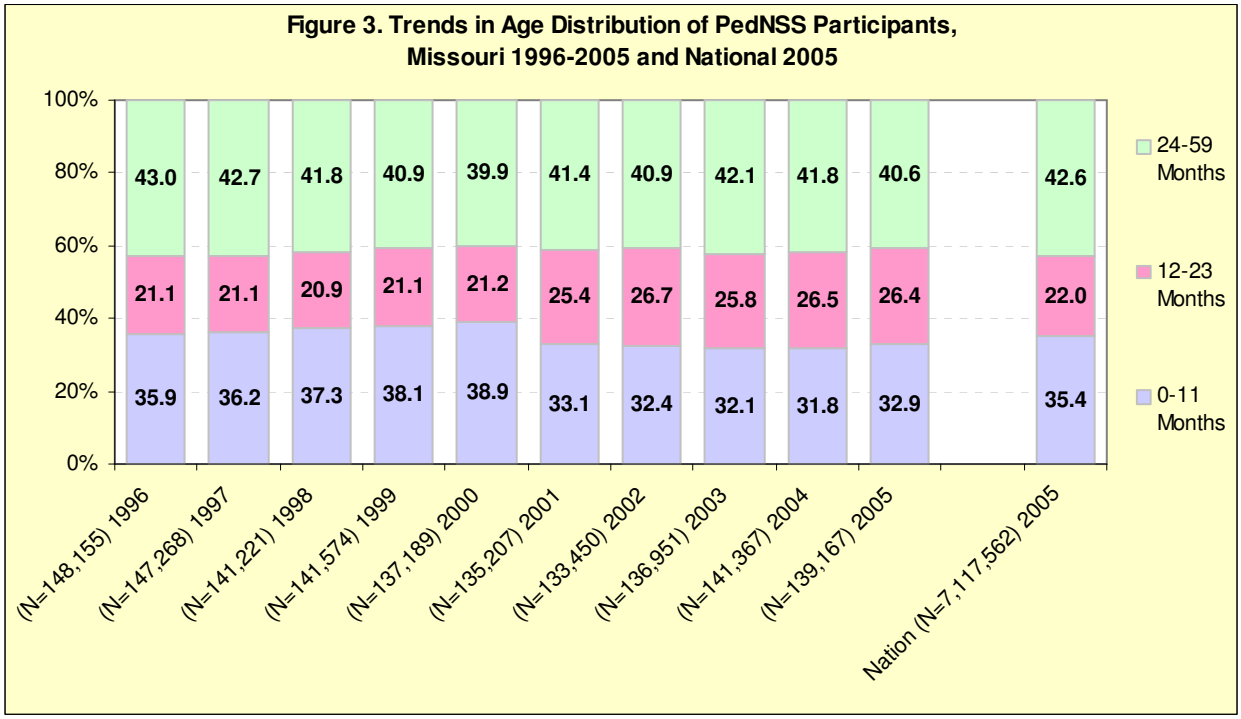
The racial and ethnic composition in Missouri differed between the rural and urban regions (Figure 2). The percentages of Non-Hispanic White participants in the urban regions of Eastern and Northwestern/Metro reflected only about half as many as were in the other, primarily rural regions. For example, Non-Hispanic White children in the Northwestern/Cameron region made up about 87.9% of the PedNSS population, while in the Eastern region this racial/ethnic group was 40.1% of the PedNSS population. The largest percentage of Non-Hispanic Black PedNSS participants (51.0%) was in the Eastern region and the smallest was in the Southwestern region (2.1%). The Northwestern/Metro region had 21.0% Hispanic children, while the Southeastern region had only 3.8%.



Note: The percentages for only the large racial and ethnic groups were shown on Figure 2.

Age

In the Missouri 2005 PedNSS, about two thirds of the PedNSS records (67.0%) were from children age 12 to 59 months. Infants (0-11 months) represented 32.9% of the Missouri 2005 PedNSS (Figure 3). These proportions have changed slightly during the past 10 years. Nationally, 35.4% of PedNSS participants in 2005 were younger than 12 months, 22.0% were age 12-23 months, and 42.6% were age 24-59 months.

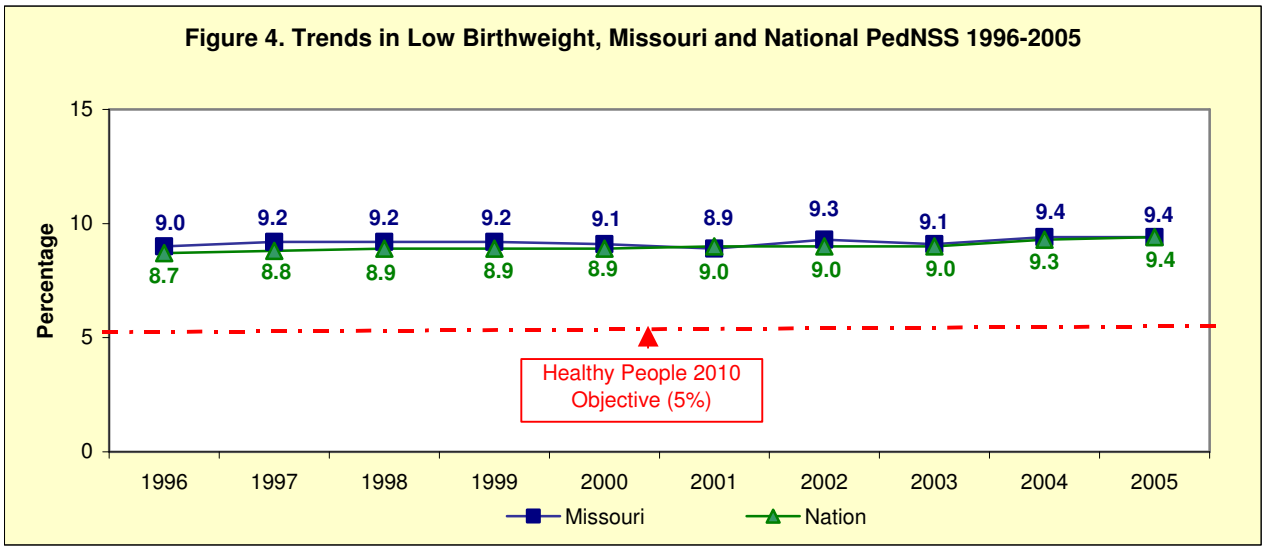


PEDIATRIC HEALTH INDICATORS

Low Birthweight[3]

Low birthweight (less than 2,500 grams or 5.5 pounds) is a major determinant of neonatal mortality and post-neonatal mortality [1]. Infants with low birthweight are more likely to experience developmental delays and disabilities than infants with normal birthweight [2]. The main factors that can lead to low birthweight include poor maternal nutrition and maternal risky behaviors, especially smoking, drinking alcohol and the use of non-prescribed drugs. Some researchers suggested that regular intake of the recommended amount of folic acid and micronutrient supplements throughout pregnancy may reduce the risk of having a low birthweight baby [3, 4]. The Healthy People 2010 Objective seeks to reduce low birthweight to 5% of all live births.

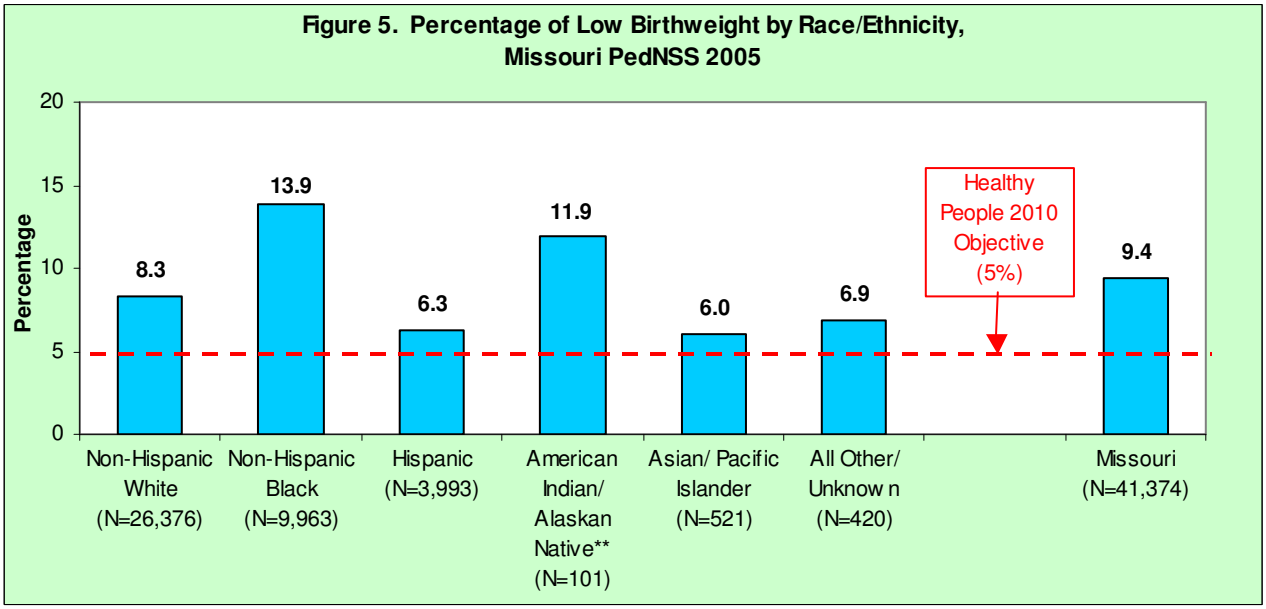
[3] Refer to the map in Appendix 1 to see the prevalence of low birthweight by county (Missouri PedNSS 2003-2005 combined years).



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Missouri (N)	38,371	37,900	37,030	38,294	38,167	38,401	38,667	39,423	40,964	41,374
Nation (N)	1,277,355	1,199,049	1,307,687	1,301,847	1,235,686	1,217,626	1,254,683	1,505,016	1,630,186	1,641,264

Note: A scale of 0%-15% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

Out of the infants born in 2005 in the Missouri PedNSS, 9.4% had low birthweight. During the last 10 years, this rate has been relatively stable (Figure 4). There has been no noticeable movement in achieving the Healthy People 2010 Objective.



Note: A scale of 0%-20% was used to show more detail.
**Please note that only 12 American Indian/Alaskan Native infants had low birthweight although the prevalence of this group was 11.9%.

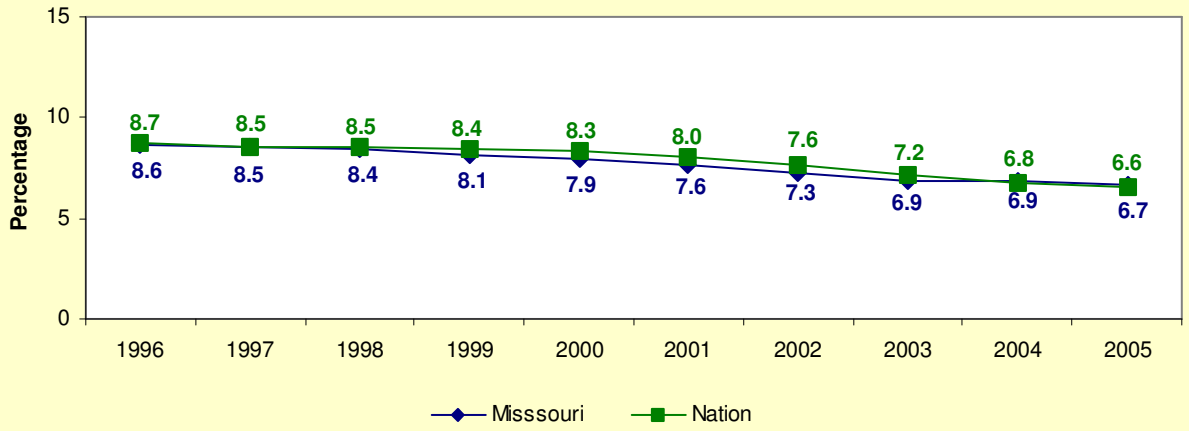
The percentage of low birthweight in the Missouri 2005 PedNSS varied by race and ethnicity. The prevalence was about 2.3 times higher among Non-Hispanic Black infants (13.9%) than among Asian/Pacific Islander infants (6.0%) (Figure 5). None of the racial and ethnic groups achieved the national goal of Healthy People 2010.

High Birthweight[4]

High birthweight (greater than 4,000 grams) increases the risk for infant death and birth injuries [5]. High birthweight may result in obesity in childhood that may extend into adult life [6]. Maternal prepregnancy overweight and greater than ideal maternal weight gain can be considered as strong predictors of high birthweight [7].

Out of the infants born in 2005 in Missouri PedNSS, 6.7% of infants were born overweight (Figure 6). During the last 10 years, this rate was highest in 1996 (8.6%) and lowest in 2005. Since 1996, the rate has been gradually decreasing, indicating that some progress has been made in the prevention of high birthweight.

Figure 6. Trends in High Birthweight, Missouri and National PedNSS 1996-2005



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
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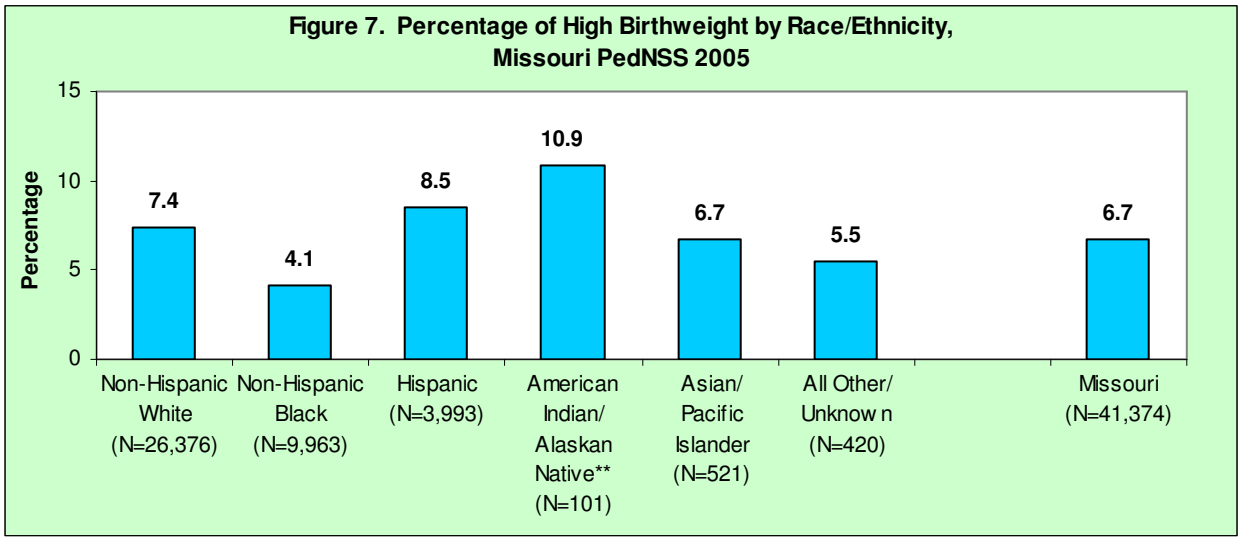
Note: A scale of 0%-15% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

[4] Refer to the map in Appendix 2 to see the prevalence of high birthweight by county (Missouri PedNSS 2003-2005 combined years).



Note: A scale of 0%-15% was used to show more detail.
**Please note that only 11 American Indian/Alaskan Native infants had high birthweight although the prevalence of this group was 10.9%.

The prevalence of high birthweight varied by racial and ethnic group. It was highest in the American Indian/Alaskan Native group (10.9%), and lowest in the Non-Hispanic Black group (4.1%).

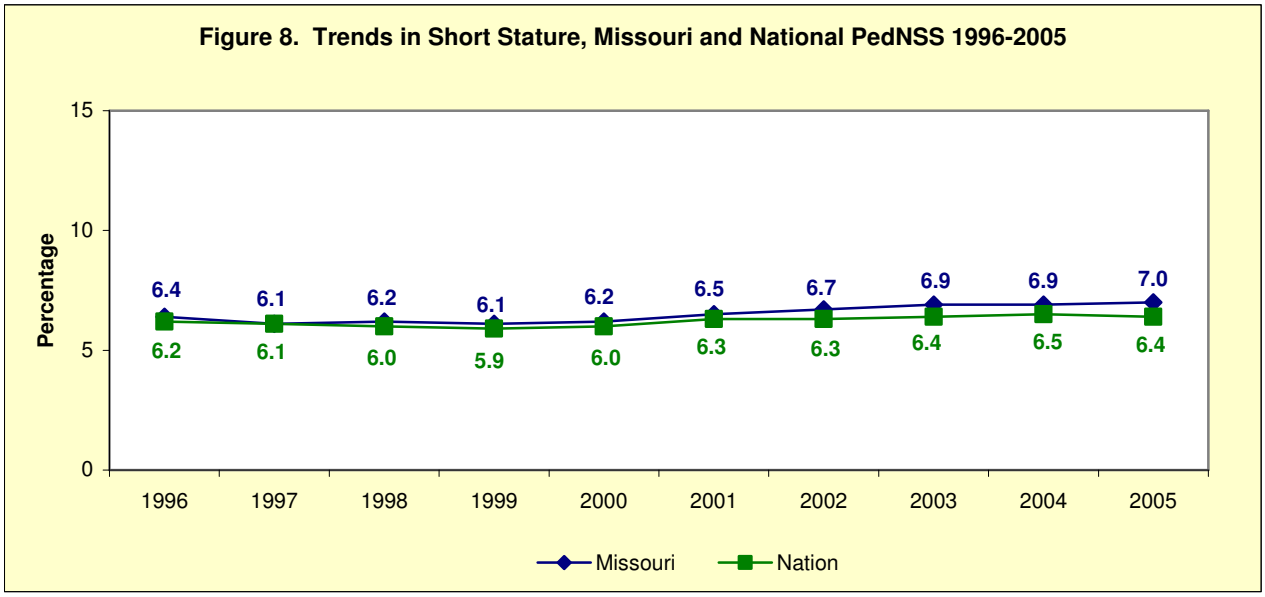
Short Stature[5]

Short stature is defined as a length or stature less than the 5th percentile on the CDC age- and gender-specific length or stature reference (2000 CDC Growth Charts). Short stature, also referred to as low-length/height-for-age or stunting, is used as an indicator of chronic malnutrition. It reflects the long-term health and nutritional history of a child. A variety of health conditions (such as low birthweight) affect growth status and there are specialized charts that may be considered for use with children affected by these conditions**.** One of the Healthy People 2010 Objectives is to reduce growth retardation to 5% among children less than 5 years of age from low-income families.

[5] Refer to the map in Appendix 3 to see the prevalence of short stature by county (Missouri PedNSS 2003-2005 combined years).

In Missouri PedNSS (children less than 5 years of age), the prevalence of short stature has been slightly increasing since 1999 (Figure 8). The lowest prevalence of 6.1% was in 1997 and 1999, and the highest prevalence of 7.0% was in 2005.

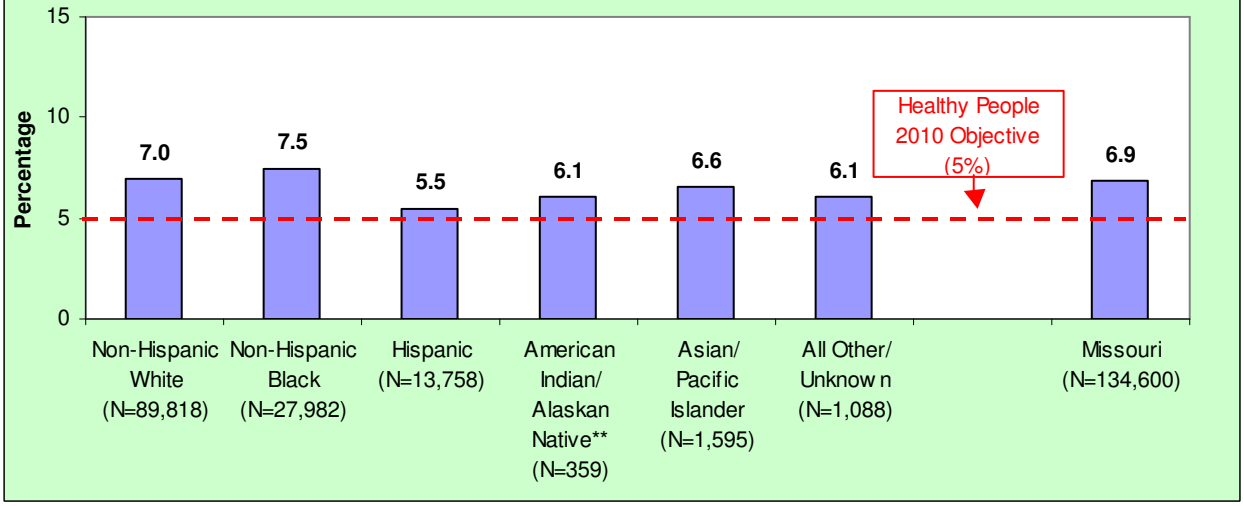
Figure 8. Trends in Short Stature, Missouri and National PedNSS 1996-2005



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Missouri (N)	144,594	143,520	137,692	137,431	132,100	130,470	128,690	131,869	136,603	134,600
Nation (N)	5,624,304	5,389,269	5,365,056	5,149,796	4,617,585	4,390,867	5,060,321	6,003,860	6,582,905	6,709,486

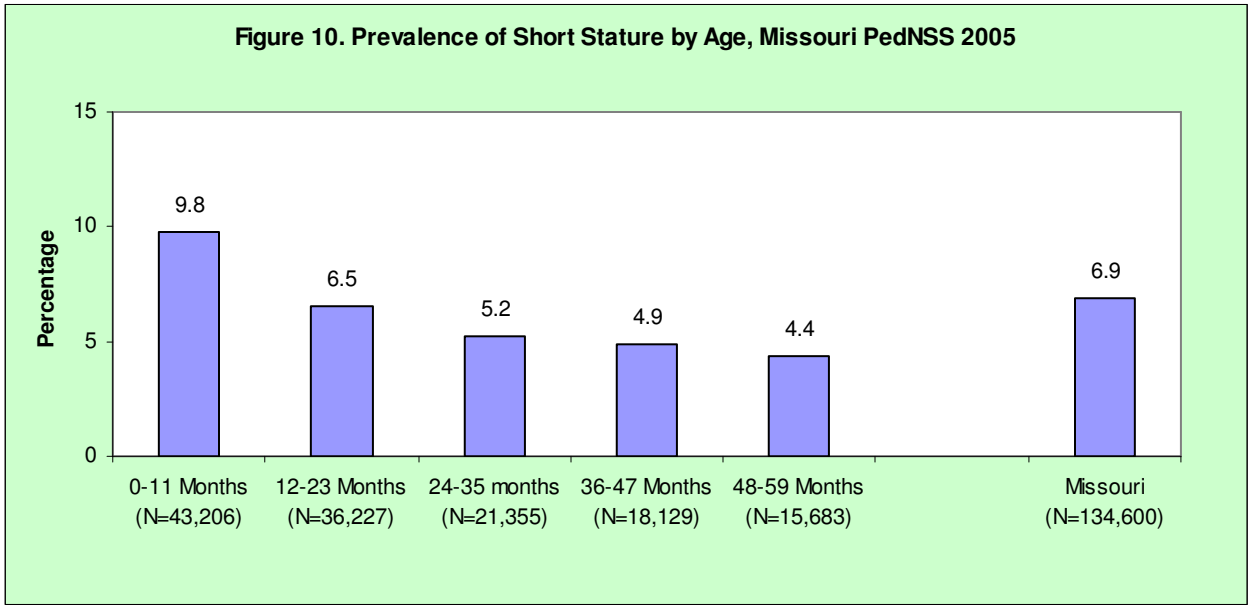
Note: A scale of 0%-15% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

Figure 9. Prevalence of Short Stature by Race/Ethnicity, Missouri PedNSS 2005



Note: A scale of 0%-15% was used to show more detail.
**Please note that only 22 American Indian/Alaskan Native infants and children had short stature although the prevalence of this group was 6.1%.

The prevalence of short stature in Missouri PedNSS in 2005 was higher than the 2010 Healthy People Objective. In the 2005 Missouri PedNSS, Non-Hispanic Black infants and children had the highest prevalence (7.5%), while Hispanic infants and children had the lowest prevalence (5.5%).



Note: A scale of 0%-15% was used to show more detail.

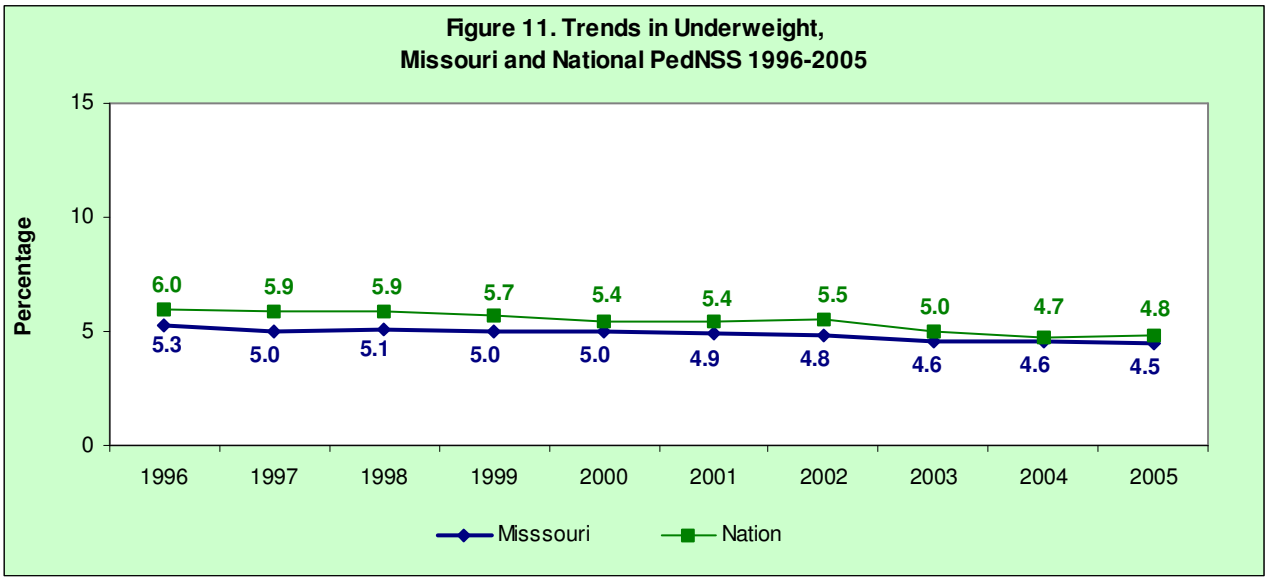
In the Missouri PedNSS 2005 population (infants and children less than 5 years of age), the prevalence of short stature decreased with the age of the participants (Figure 10). The age group of 0-11 months had the highest prevalence of short stature (9.8%), and the age group of 48-59 months had the lowest prevalence (4.4%).

Underweight[6]

Underweight in the PedNSS is based on the 2000 CDC gender-specific growth chart percentiles of less than the 5th percentile weight-for-length for children younger than 2 years of age and less than the 5th percentile BMI[7]-for-age for children age 2 years or older. Food shortages and disease outbreaks can result in high prevalence of underweight infants and children [8], so an underweight prevalence rate greater than 5% may indicate serious health and nutrition problems.

[6] Refer to the map in Appendix 4 to see the prevalence of underweight by county (Missouri PedNSS 2003-2005 combined years).

[7] BMI, Body Mass Index, is a number calculated from a person's weight and height. Then formula is weight in kilograms divided by height in meters squared (kg/m2).



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
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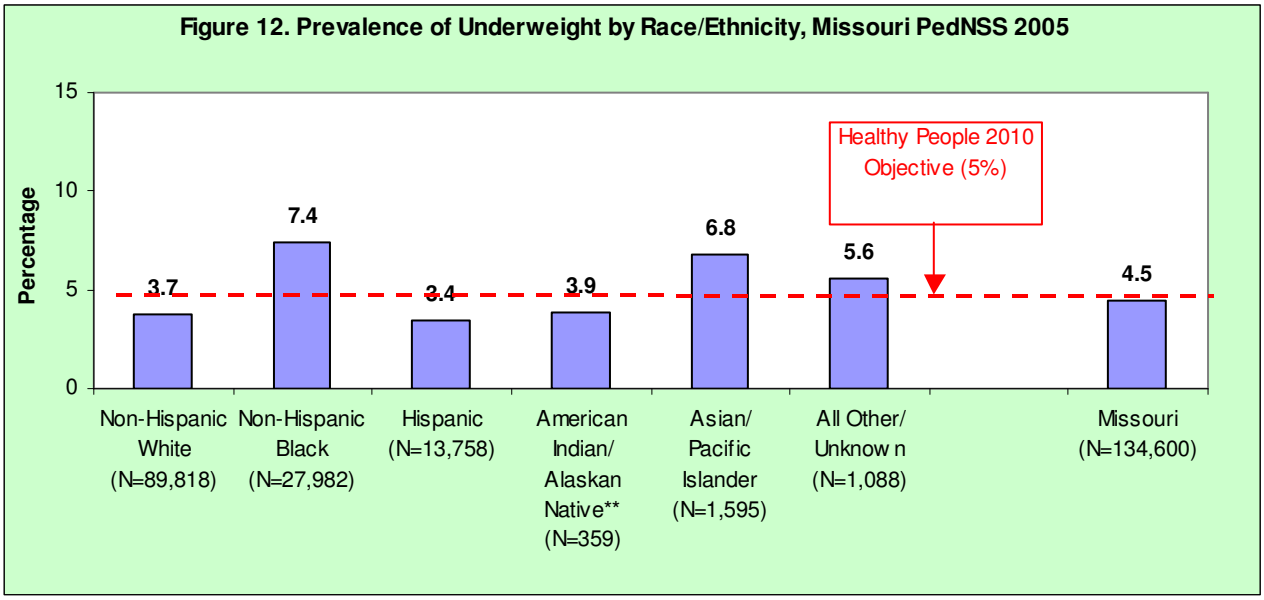
Note: A scale of 0%-15% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

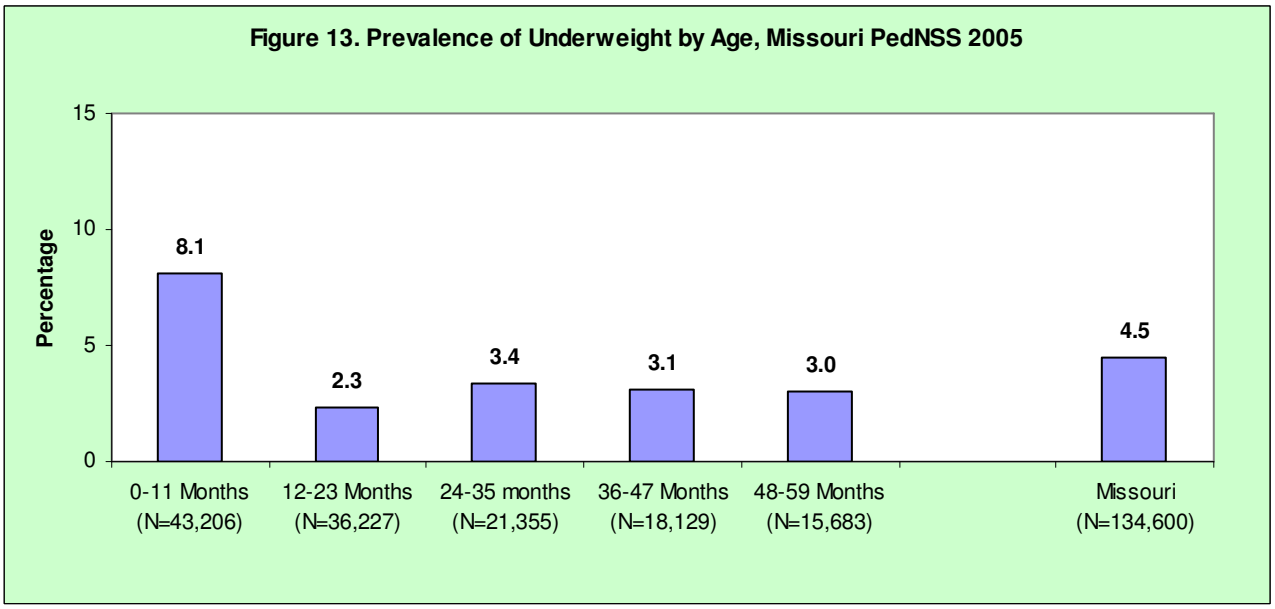
Over the last 10 years, the prevalence of underweight in the Missouri PedNSS (infants and children less than 5 years of age) has decreased from 5.3% in 1996 to 4.5% in 2005 (Figure 11). Overall, the 2005 rate indicated that acute malnutrition was not a public health problem in the Missouri PedNSS population, because the prevalence of underweight children under 5 years of age in 2005 (4.5%) was lower than the Healthy People 2010 Objective of 5.0%.

The higher prevalence of underweight in the Missouri PedNSS 2005 occurred among Non-Hispanic Black children (7.4%) and Asia/Pacific Islander children (6.8%) (Figure 12). However, the

percentages of underweight children in the Non-Hispanic White, Hispanic, and American Indian/Alaskan Native groups were lower than the Healthy People 2010 Objective of 5%.



Note: A scale of 0%-15% was used to show more detail.
**Please note that only 14 American Indian/Alaskan Native infants and children were underweight although the prevalence of this group was 3.9%.

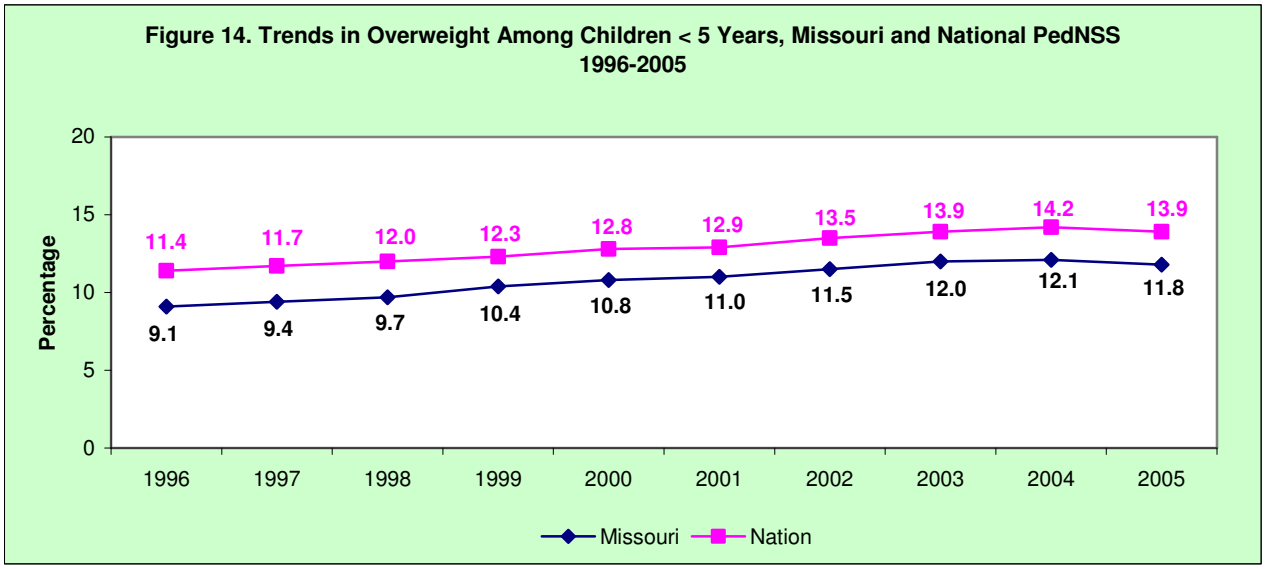


Note: A scale of 0%-15% was used to show more detail.

Infants (0-11 months old) were at higher risk of being underweight in the Missouri PedNSS population in year 2005 (8.1%) compared to the other age groups.

Overweight (Birth to 5 Years of Age)[8]

The prevalence of childhood and adolescent overweight has tripled over the past two decades. Associations have been identified between dietary patterns, physical activity, sedentary behaviors, and overweight [9]. In the PedNSS, overweight is based on the 2000 CDC growth chart percentiles of greater than or equal to the 95th percentile weight-for-length for children less than 2 years of age and greater than or equal to the 95th percentile BMI-for-age for children 2 years of age or older.



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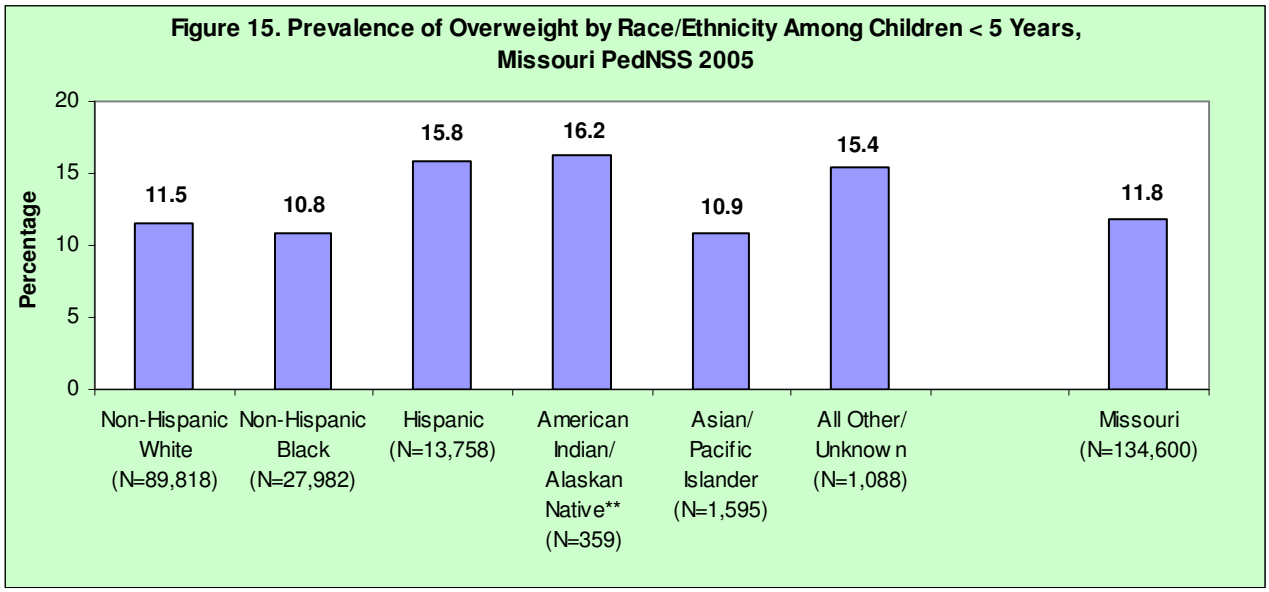
Note: A scale of 0%-20% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

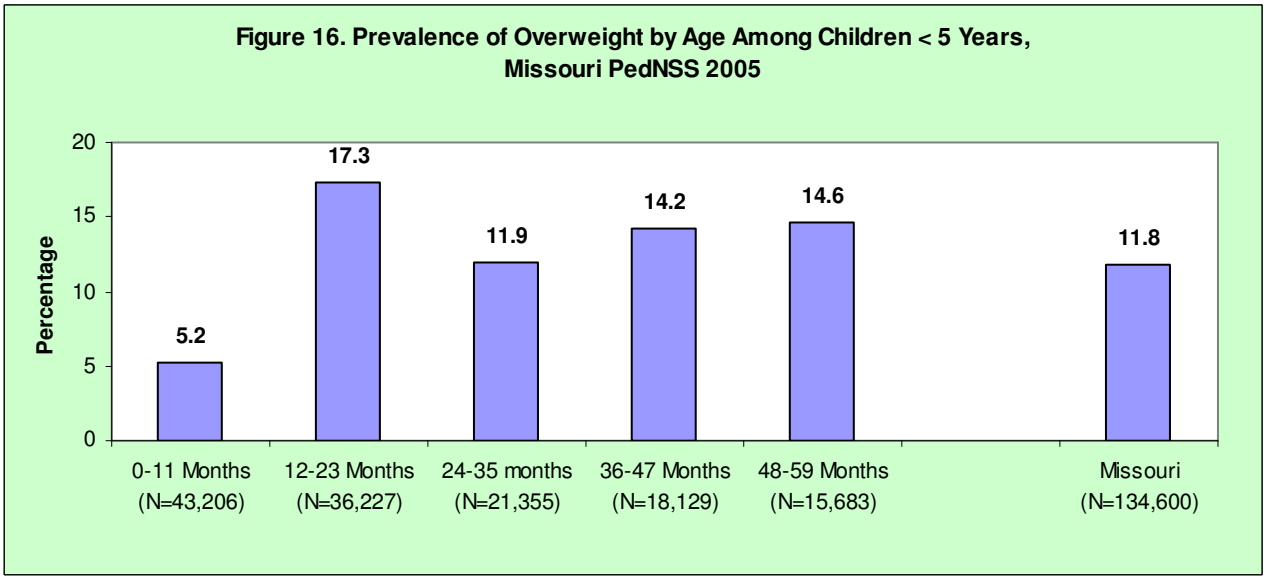
In the Missouri PedNSS 2005, during the last 10 years, the proportion of overweight in children from birth to age 5 years has been increasing from 9.1% in 1996 to 12.1% in 2004 (Figure 14). However, for the first time in over more than 10 years, the overweight rates for both Missouri and the nation slightly declined in the year 2005.

[8] Refer to the map in Appendix 5 to see the prevalence of overweight (birth to 5 years of age) by county (Missouri PedNSS 2003-2005 combined years).



Note: A scale of 0%-20% was used to show more detail.
**Please note that only 58 American Indian/Alaskan Native infants were overweight although the prevalence of this group was 16.2%.

The highest prevalence of overweight in the Missouri PedNSS 2005 occurred among American Indian/Alaskan Native children (16.2%) (Figure 15). However, the next highest prevalence of 15.8% among the Hispanic infants and children is more significant, due to the larger number of Hispanic participants (N=13,758). The percentage of Non-Hispanic Black (10.8%) children being overweight was the lowest.



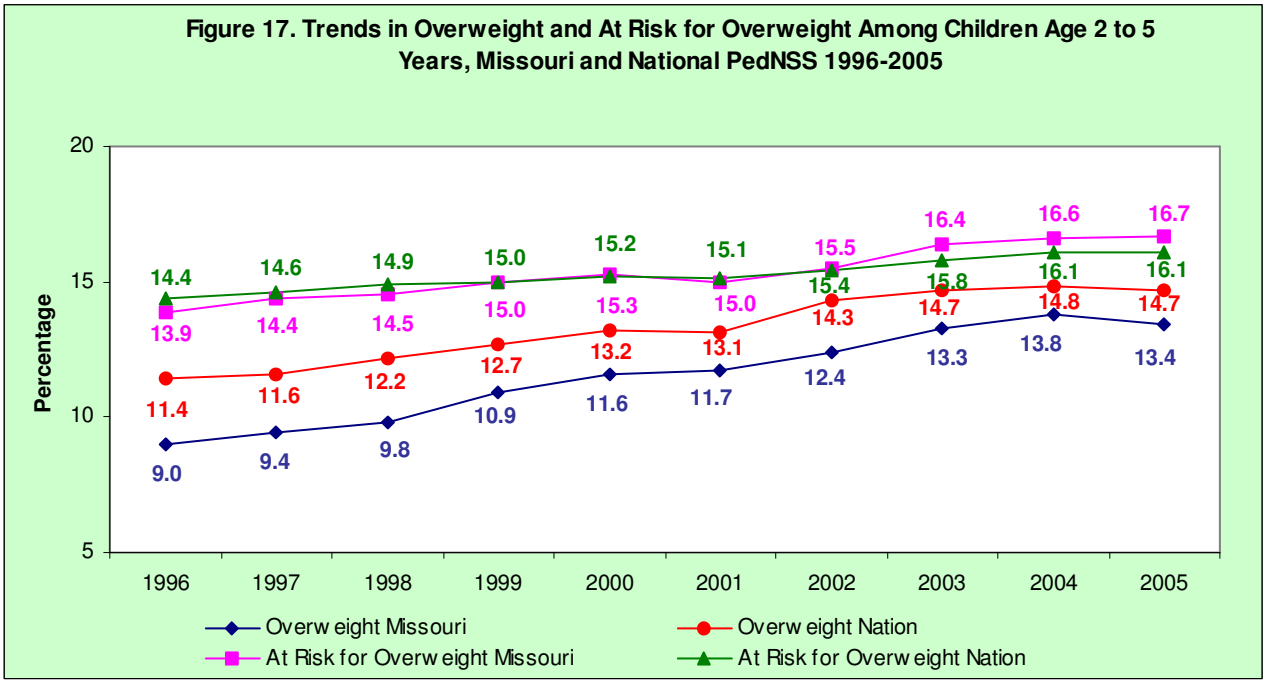
Note: A scale of 0%-20% was used to show more detail.

From the perspective of age groups, the highest prevalence of overweight in the Missouri PedNSS 2005 was in the 12-23 months group, and lowest prevalence was in the 0-11 months group (Figure 16).

Overweight and At Risk for Overweight (2 to 5 Years of Age)[9]

Overweight in children younger than 2 years old does not cause the same risk as for children age 2 or older. A weak association has been found between the 2 years or older group's weight and an increased risk for adult obesity [10]. The Expert Committee on Clinical Guidelines for Overweight in Adolescent Preventive Services recommended a two-level screening for overweight in children age 2 years or older. The suggestion was to use BMI-for-age at or above the 95th percentile to define overweight and between the 85th and 95th percentile to define at risk for overweight [11].

Figure 17. Trends in Overweight and At Risk for Overweight Among Children Age 2 to 5 Years, Missouri and National PedNSS 1996-2005

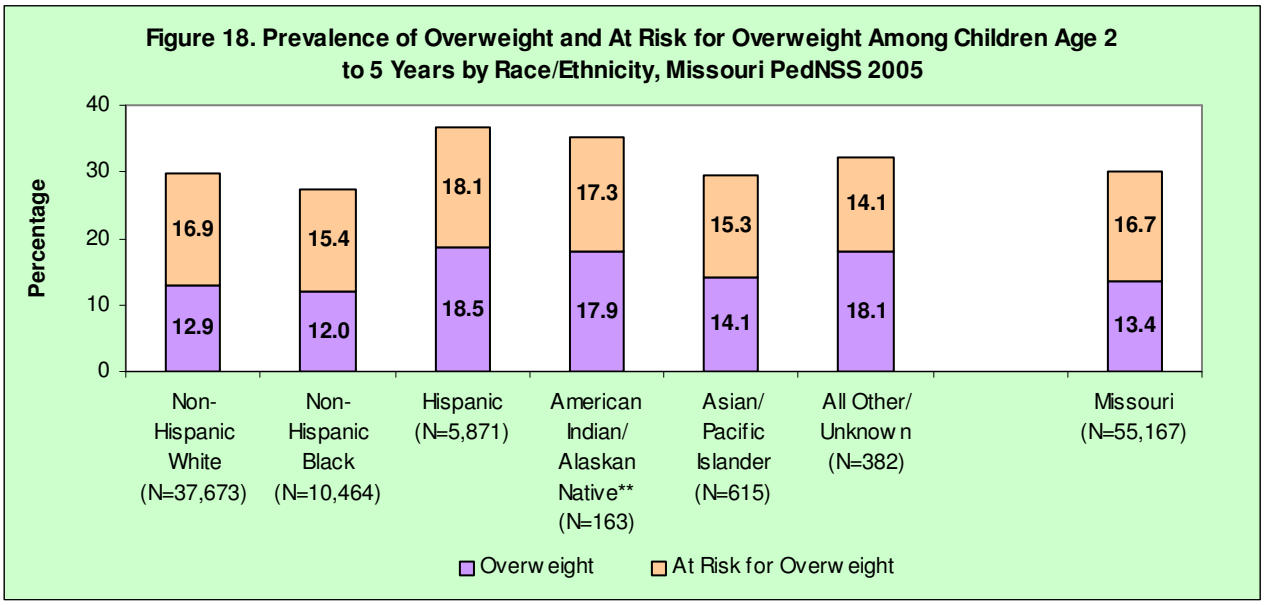


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Missouri (N)	62,664	61,820	58,000	56,711	53,548	54,672	53,243	56,346	57,587	55,167
Nation (N)	2,479,125	2,396,884	2,320,924	2,187,151	1,932,131	1,814,873	2,139,100	2,576,591	2,814,475	2,869,075

Note: A scale of 5%-20% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

Over the last 10 years, the rate of overweight increased from 9.0% in 1996 to 13.8% in 2004, but decreased for the first time to 13.4% in 2005 among Missouri's PedNSS children, age 2 to 5 years (Figure 17). However, the rate of at risk for overweight for this group of children has increased from 13.9% in 1996 to 16.7% in 2005.

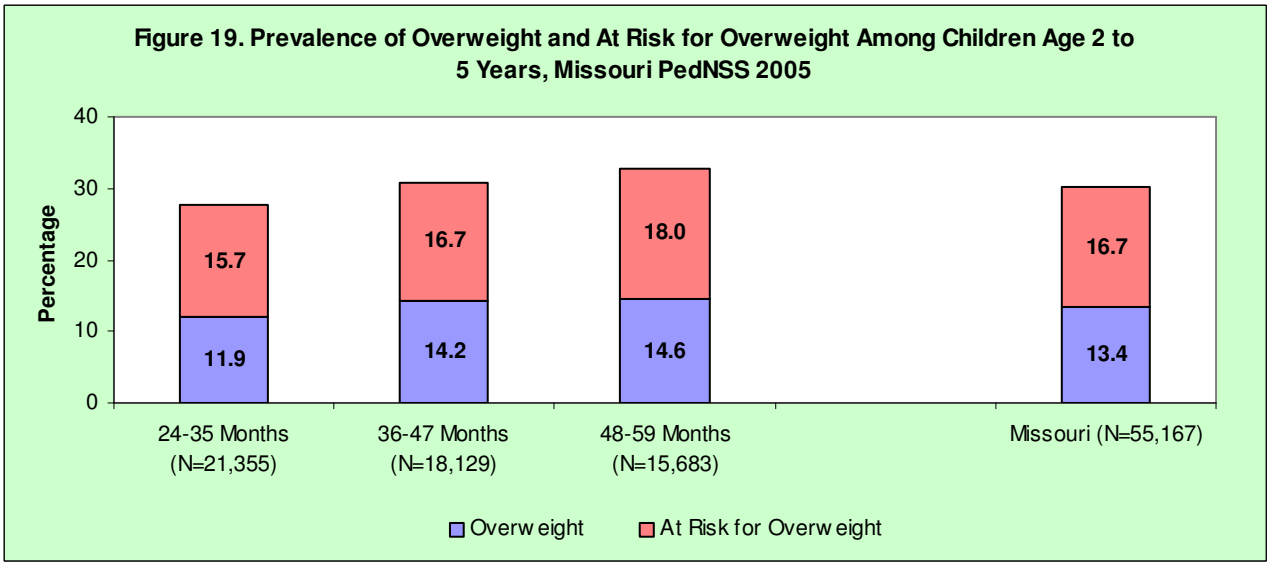
[9] Refer to the maps in Appendix 6 and Appendix 7 to see the rates of overweight and at risk for overweight (2-5 years of age) by county (Missouri PedNSS 2003-2005 combined years).



Note: A scale of 0%-40% was used to show more detail.

** Please note that only 29 American Indian/Alaskan Native children were overweight and 28 American Indian/Alaskan Native children were at risk for overweight although the rates of both categories were high compared to most of the race/ethnicity groups.

In the Missouri PedNSS 2005, the highest rates of overweight (18.5%) and at risk for overweight (18.1%) were among Hispanic children (Figure 18). Compared to all other racial and ethnic groups, Non-Hispanic Black PedNSS children age 2 to 5 years were the least likely to be at risk for overweight (15.4%) and overweight (12.0%).



Note: A scale of 0%-40% was used to show more detail.

The proportion of overweight children increased with age in the Missouri PedNSS 2005 (Figure 19). In the age group 24-35 months, 11.9% of the children were overweight; in the age group 36-47 months, 14.2% of the children were overweight; and in the age group 48-59 months, 14.6% of the children were overweight. The proportion of at risk for overweight children increased with age, too.

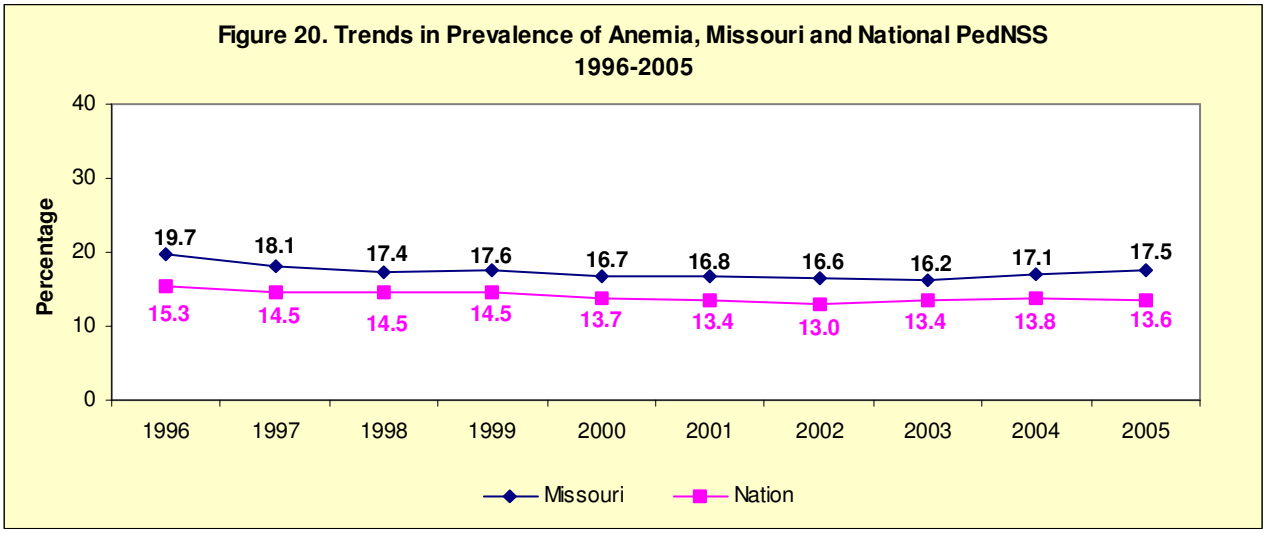
Respectively, 15.7%, 16.7%, and 18.0% in age groups 24-35 months, 36-47 months, and 48-59 months, were overweight.

Anemia (Low Hemoglobin/Hematocrit)[10]

Anemia in the PedNSS refers to a hemoglobin or hematocrit level lower than the age-adjusted reference range for healthy children[11]. Anemia is the most common indicator of nutrient (iron) deficiency in the world [12]. Iron deficiency in children is associated with long-lasting diminished mental, motor and behavioral functioning [13]. Racial differences apparently exist, with Non-Hispanic Black children having lower normal values than Non-Hispanic White and Asian/Pacific Islander children of the same age and socioeconomic background [14]. The Healthy People 2010 Objective is to reduce anemia among children age 1 to 2 years to 5% and children age 3 to 4 years to 1%[12].

In Missouri PedNSS 2005, the prevalence of anemia (infants and children 6 months of age and older included in analysis)[13] declined since 1996 (Figure 20). It reached the lowest point of 16.2% in 2003, but increased to 17.5% in 2005.

Figure 20. Trends in Prevalence of Anemia, Missouri and National PedNSS 1996-2005



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Missouri (N)	115,217	113,552	106,836	106,770	95,373	86,454	85,831	86,726	89,598	86,931
Nation (N)	4,158,251	3,925,299	3,864,299	3,645,746	3,217,568	3,116,606	3,421,187	3,600,353	4,364,901	4,381,087

Note: A scale of 0%-40% was used to show more detail. It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

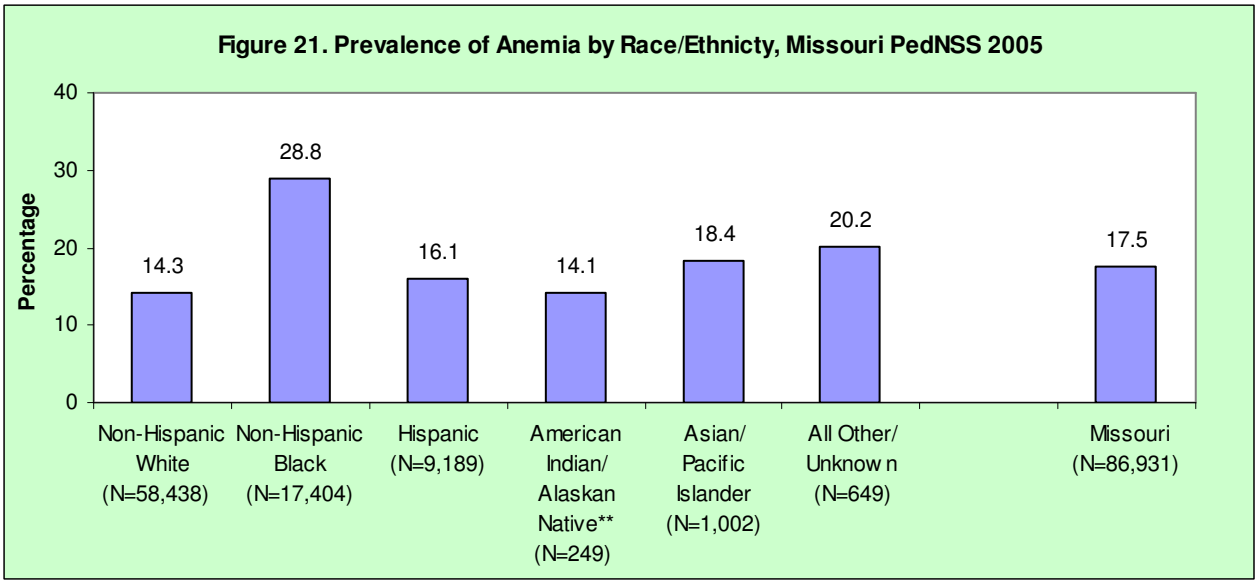
[10] Refer to the map in Appendix 8 to see the prevalence of anemia by county (Missouri PedNSS 2003-2005 combined years).

[11] In PedNSS, children age 1 to 2 years are considered anemic if their hemoglobin concentration is less than 11.0 g/dL or their hematocrit level is less than 33.0%. Children age 2-5 years are considered anemic if their hemoglobin concentration is less than 11.1 g/dL or their hematocrit level is less than 33.3%.

[12] In PedNSS, age groups are 6-11 months, 12-17 months, 18-23 months, 24-35 months, and 36-59 months. Therefore, this classification does not allow comparing low hemoglobin/hematocrit rates directly between PedNSS and the Healthy People 2010 objective.

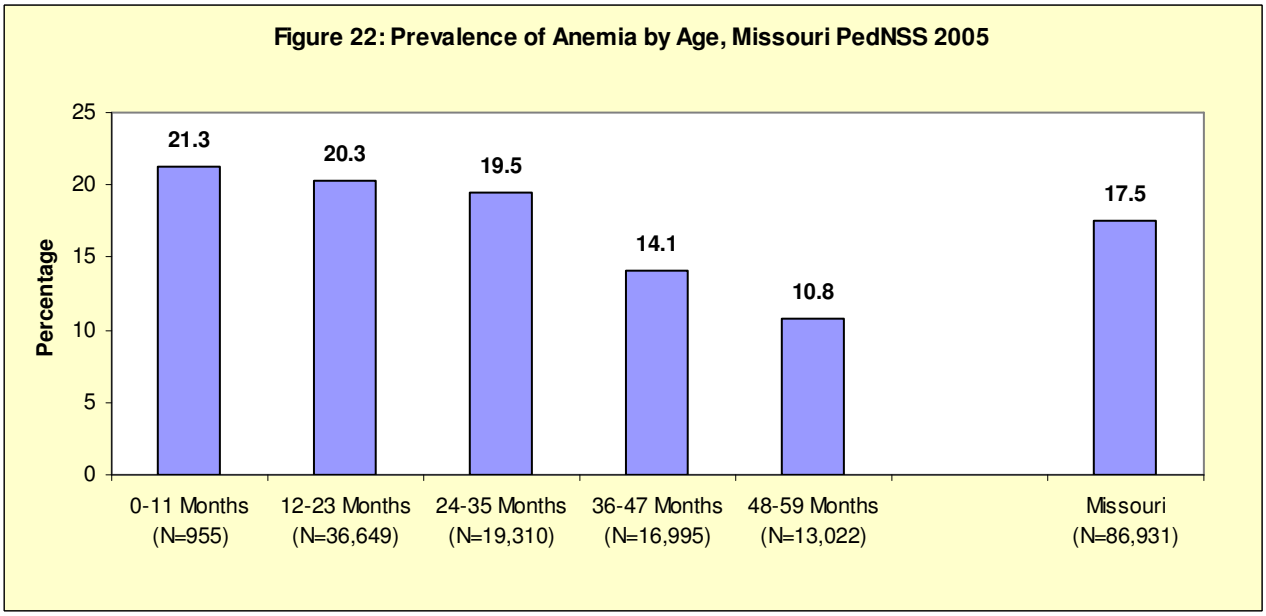
[13] For this indicator, infants less than 6 months of age were not included in analysis.

The proportion of infants and children with anemia (low hemoglobin/hematocrit) in the Missouri PedNSS 2005 varied in different racial and ethnic groups. The highest proportion of participants with low hemoglobin/hematocrit was in the Non-Hispanic Black Missouri PedNSS population (28.8%) (Figure 21). The lowest prevalence of anemia was in the American Indian/Alaskan Native group (14.1%).



Note: A scale 0%-40% was used to show more detail.
**Please note that only 35 American Indian/Alaskan Native infants and children were anemic although the prevalence of this group was 14.1%.

The highest prevalence of anemia (21.3%) in the Missouri PedNSS in 2005 occurred in infants 0-11 months old (Figure 22). In general, the rate decreased as the children became older.

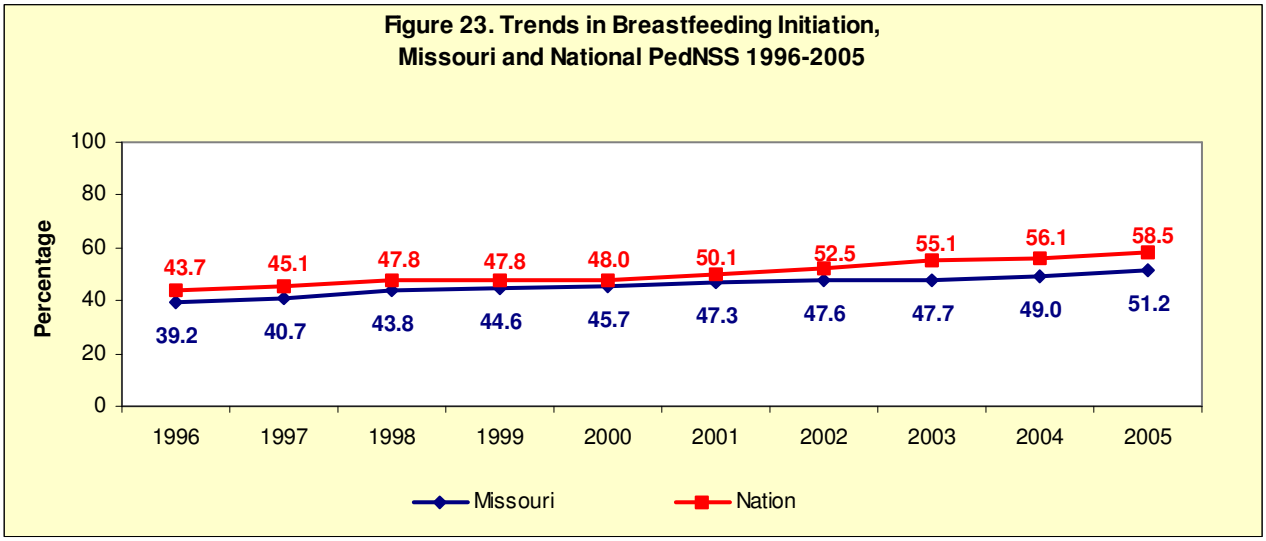


Note: A scale 0%-25% was used to show more detail.

Breastfeeding Initiation[14]

The health and economic benefits of breastfeeding are well documented. According to the American Academy of Pediatrics (AAP), human milk is "uniquely suited" for human infants [15]. With rare exceptions, human milk provides the most complete form of nutrition for infants, including premature and sick newborns [16]. Accordingly, the AAP recommends that infants be breastfed exclusively for the first six months after birth and that breastfeeding continue through the entire first year of life. Breastfeeding after the first 12 months should continue as long as mutually desired. When direct breastfeeding is not possible, expressed breast milk, fortified when necessary for the premature infant, should be provided [17].

Figure 23. Trends in Breastfeeding Initiation, Missouri and National PedNSS 1996-2005



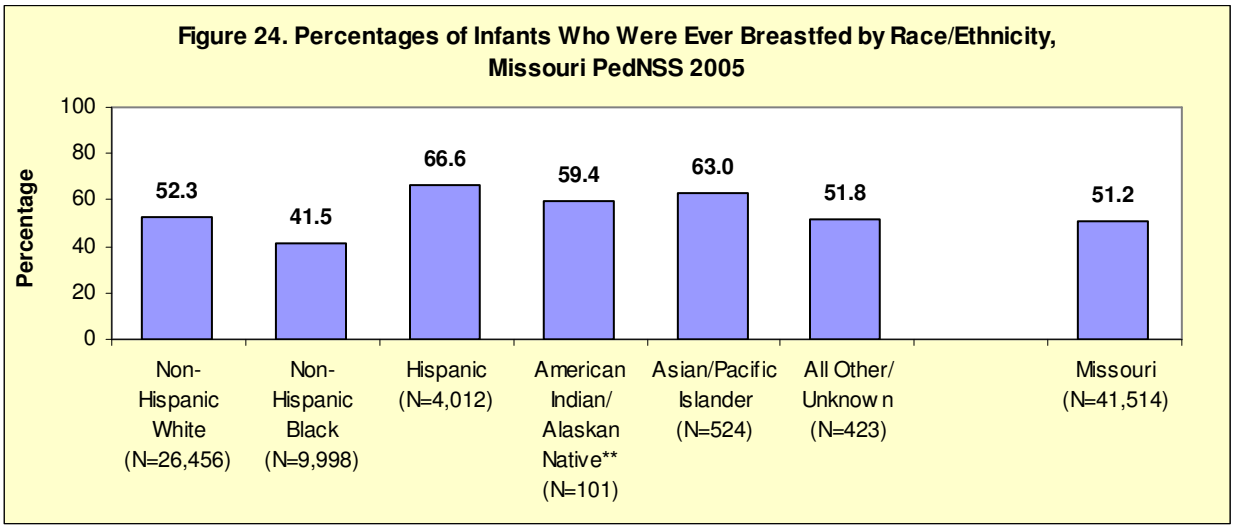
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Missouri (N)	38,533	38,037	37,189	38,516	38,345	38,582	37,823	38,757	40,666	41,514
Nation (N)	796,109	750,078	877,246	864,433	905,154	553,594	1,014,091	1,244877	1,466,352	1,515,954

Note: It is advised that the trends data in Missouri and the nation should not be compared directly since they had different distributions on race/ethnicity.

In the PedNSS, breastfeeding initiation is determined by ever breastfed. The overall rate of breastfeeding initiation among infants in the Missouri PedNSS has been increasing over the last 10 years from 39.2% in 1996 to 51.2% in 2005 (Figure 23). The Healthy People 2010 Objective in breastfeeding initiation (75%) was far from being achieved in the Missouri WIC population in 2005.

Hispanic babies were more likely to be ever breastfed than infants in all other racial and ethnic groups in the Missouri PedNSS 2005 (66.6%) (Figure 24). The Non-Hispanic Black infants were the least likely to be ever breastfed in 2005 (41.5%).

[14] Refer to the map in Appendix 9 to see the percentage of infants ever breastfed by county (Missouri PedNSS 2003-2005 combined years).



** Please note that 60 American Indian/Alaskan Native infants were ever breastfed.

CONCLUSIONS AND RECOMMENDATIONS

An important use of the PedNSS data is to compare the status of certain indicators in Missouri with the Healthy People 2010 Objectives that were developed for the nation. These objectives were designed to serve as a goal for monitoring progress towards improving the health of the nation.

Table 1: Monitoring Healthy People 2010 Objectives Using Missouri PedNSS Trends 1996-2005 and Comparing Missouri and National PedNSS Data on Selected Health and Behavioral Indicators

Indicator	Healthy People 2010 Objectives Monitored by PedNSS*	Trend of the Missouri PedNSS 1996-2005	National PedNSS Rate 2005	Missouri PedNSS Adjusted Rate 2005**
Low Birthweight	Decrease low birthweight to 5% (16-10b)	Stable	9.4	8.4
Short Stature Underweight	Reduce growth retardation among low-income children under 5 years of age to 5% (19-4) Short Stature Underweight	Slight increase since 1999 Decrease since 1996	6.4 4.8	6.3 4.3
Breastfeeding Initiation	Increase the proportion of mothers who breastfeed in the early postpartum period to 75% (16-19a)	Increase since 1996	58.5	55.1
Breastfed At Least 6 Months	Increase the proportion of mothers who breastfeed at 6 months to 50 % (16-19b)		24.3	No reliable data***
Breastfed At Least 12 Months	Increase the proportion of mothers who breastfeed at 12 months to 25% (16-19c)		17.7	No reliable data***

* Healthy People 2010 Objectives on web: http://www.healthypeople.gov.
** Adjusted rates according to CDC's procedure.
*** Previous procedures for breastfeeding duration data collection did not capture adequate data to measure duration. However, the procedures were modified in 2005 to allow for collecting more reliable data since 2006 for the measurement of breastfeeding duration.

The 10-year trend data (from 1996 to 2005) showed some improvements in decreasing the proportion of underweight infants and children in the WIC population. Additionally, progress has been made in

breastfeeding initiation. However, the Healthy People 2010 Objectives pertaining to reduction of the percentage of low birthweight and growth retardation (short stature) have not shown advances (Table 1).

Compared with the national PedNSS data as shown in Table 1, the percentage of low birth weight babies and the percentage of underweight babies in Missouri PedNSS 2005 were lower than the national average levels. Missouri had almost the same rate on the indicator of short stature as that in the national PedNSS in this year. However, the breastfeeding initiation rate in Missouri PedNSS 2005 was lower than the national average level.[15]

The PedNSS data summary indicates the need for the following actions:

- Prevent low birthweight by providing preconception nutrition care and outreach activities to promote early identification of pregnancy and early entry into comprehensive prenatal care, including medical care and WIC program services.

- Identify children with short stature and appropriately monitor to assure that they receive adequate nutrients to promote optimal growth, and that there are no other health problems limiting growth.

- Implement innovative strategies to reverse the rising trend of overweight in young children by increasing breastfeeding, increasing physical activity, promoting increased consumption of fruits and vegetables, and decreasing sedentary time. Routinely screen for overweight and at risk for overweight using BMI-for-age recommended by the American Academy of Pediatrics Policy Statement [18].

- Conduct hemoglobin/hematocrit screening to identify all infants and children at highest risk of having iron deficiency anemia, develop and implement effective intervention strategies, including nutrition education focused on iron rich foods and iron absorption-enhancing foods and provide follow-up to improve iron nutrition status.

- Promote and support breastfeeding through medical care systems, work sites and communities.

[15] The proportions of racial and ethnic indicators in the national 2005 PedNSS were different from those in the Missouri 2005 PedNSS. Therefore, to make the Missouri PedNSS population comparable on indicators of interest to the Nation, a standardization procedure was applied to Missouri's PNSS data when a comparison occurs. The procedure is available on CDC's website: http://www.cdc.gov/pednss/how_to/interpret_data/what/example.htm

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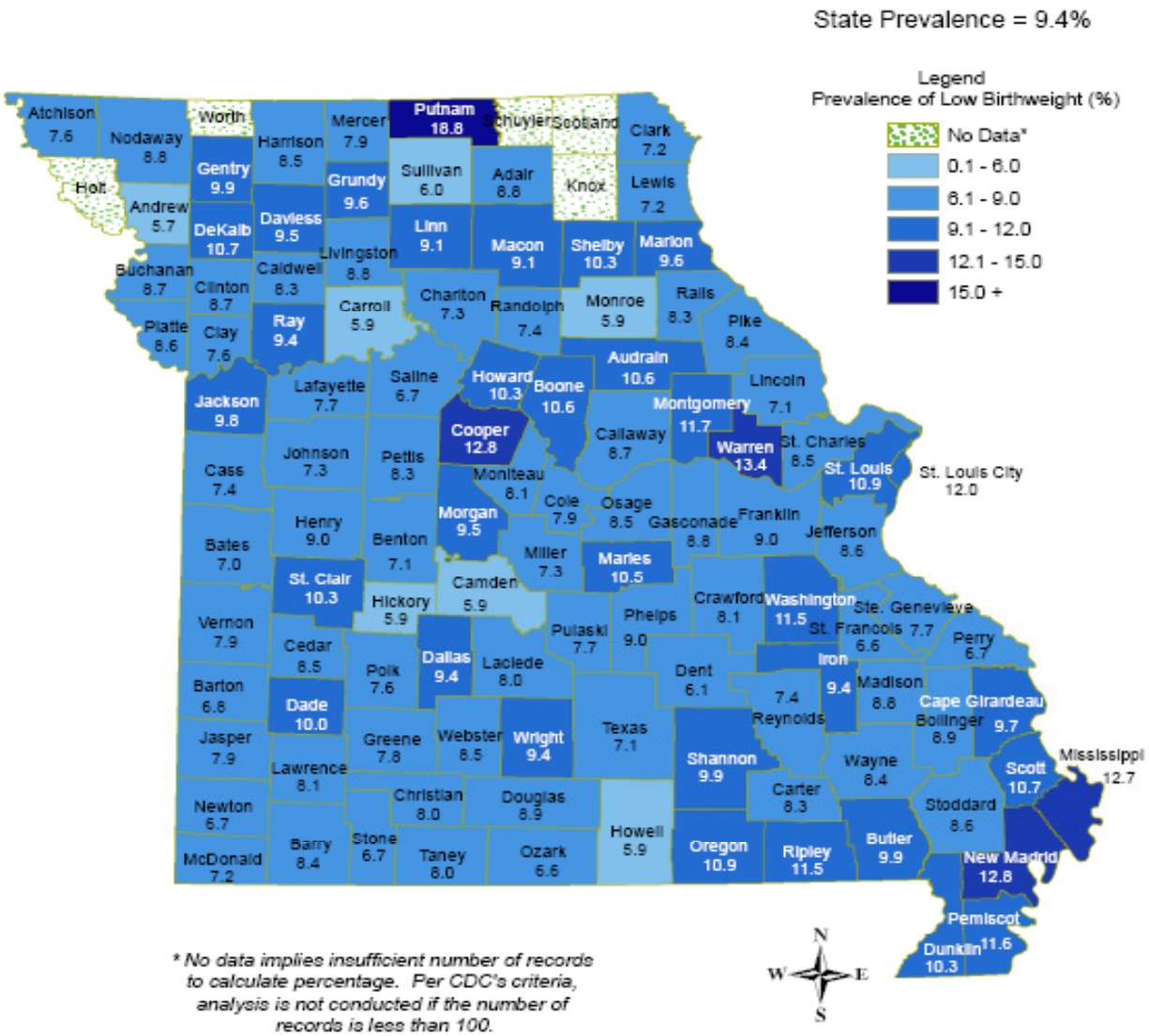
[18]. American Academy of Pediatrics Committee on Nutrition. Policy statement: prevention of pediatric overweight and obesity. Pediatrics (serial online) 2003; 112(2): 424-430.

APPENDICES

Appendix 1

Prevalence of Low Birthweight by County, Missouri PedNSS 2003-2005 Combined Years

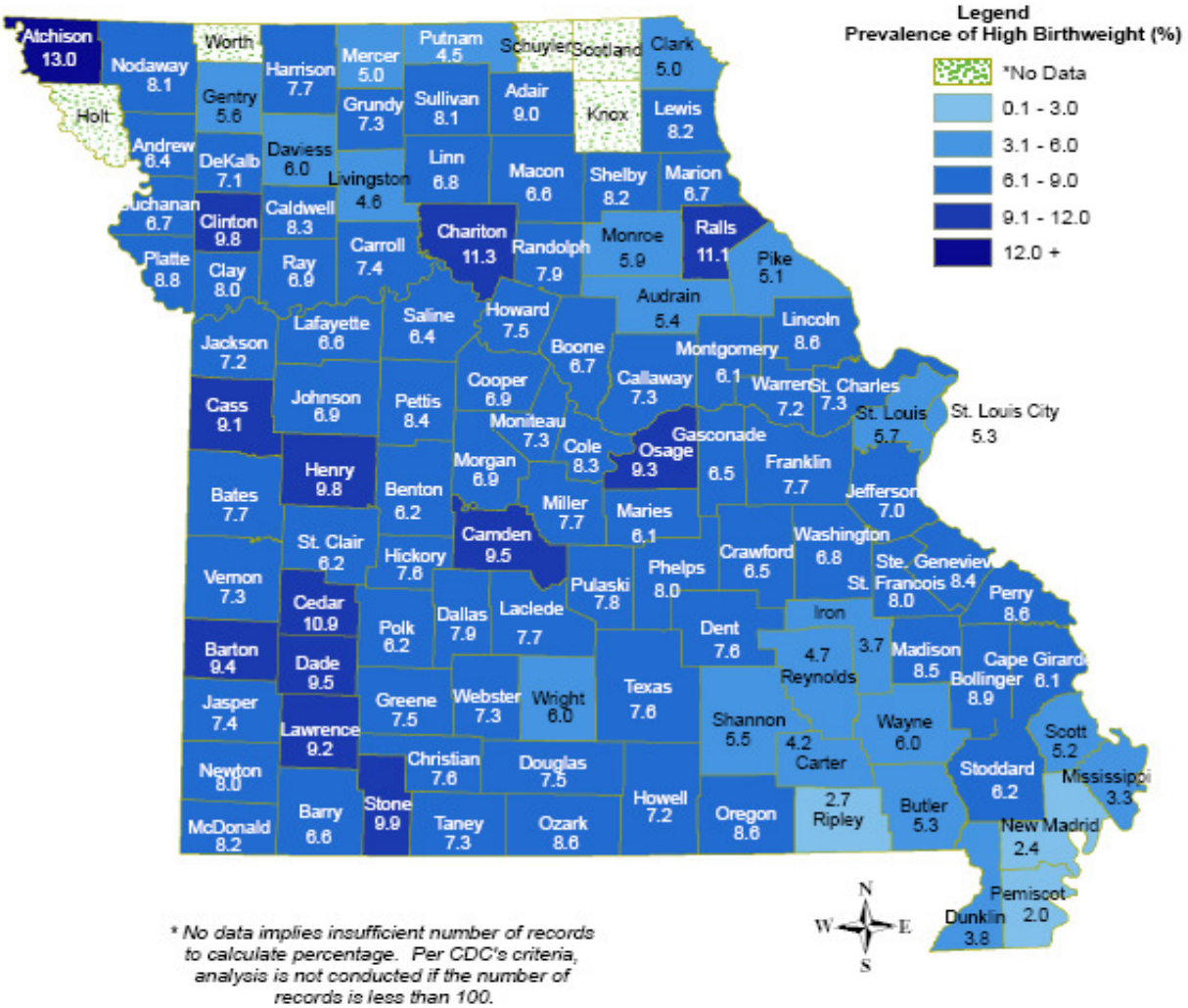


** No data implies insufficient number of records to calculate percentage. Per CDC's criteria, analysis is not conducted if the number of records is less than 100.*

Appendix 2

Prevalence of High Birthweight by County, Missouri PedNSS 2003-2005 Combined Years

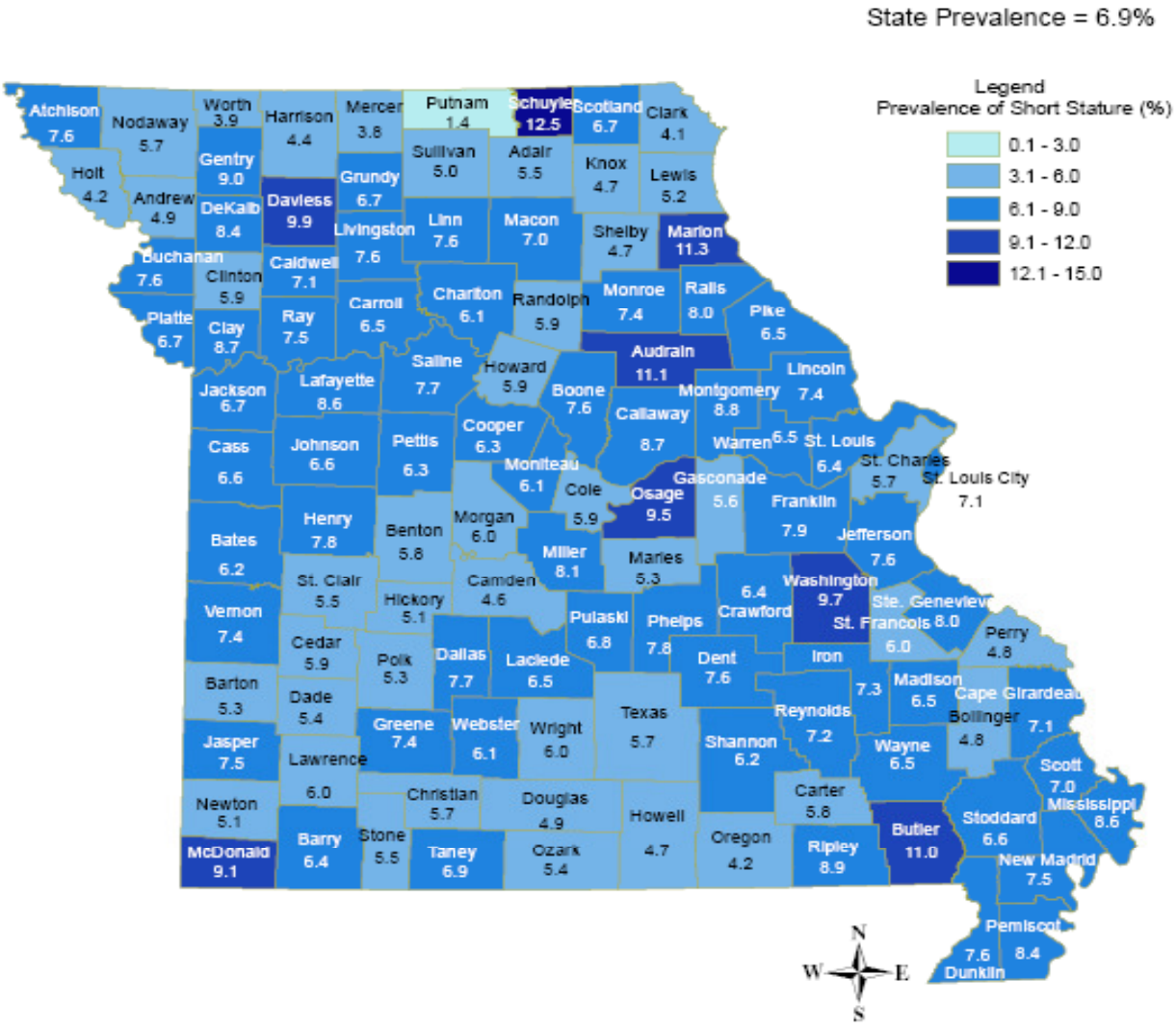
State Prevalence = 6.7%



** No data implies insufficient number of records to calculate percentage. Per CDC's criteria, analysis is not conducted if the number of records is less than 100.*

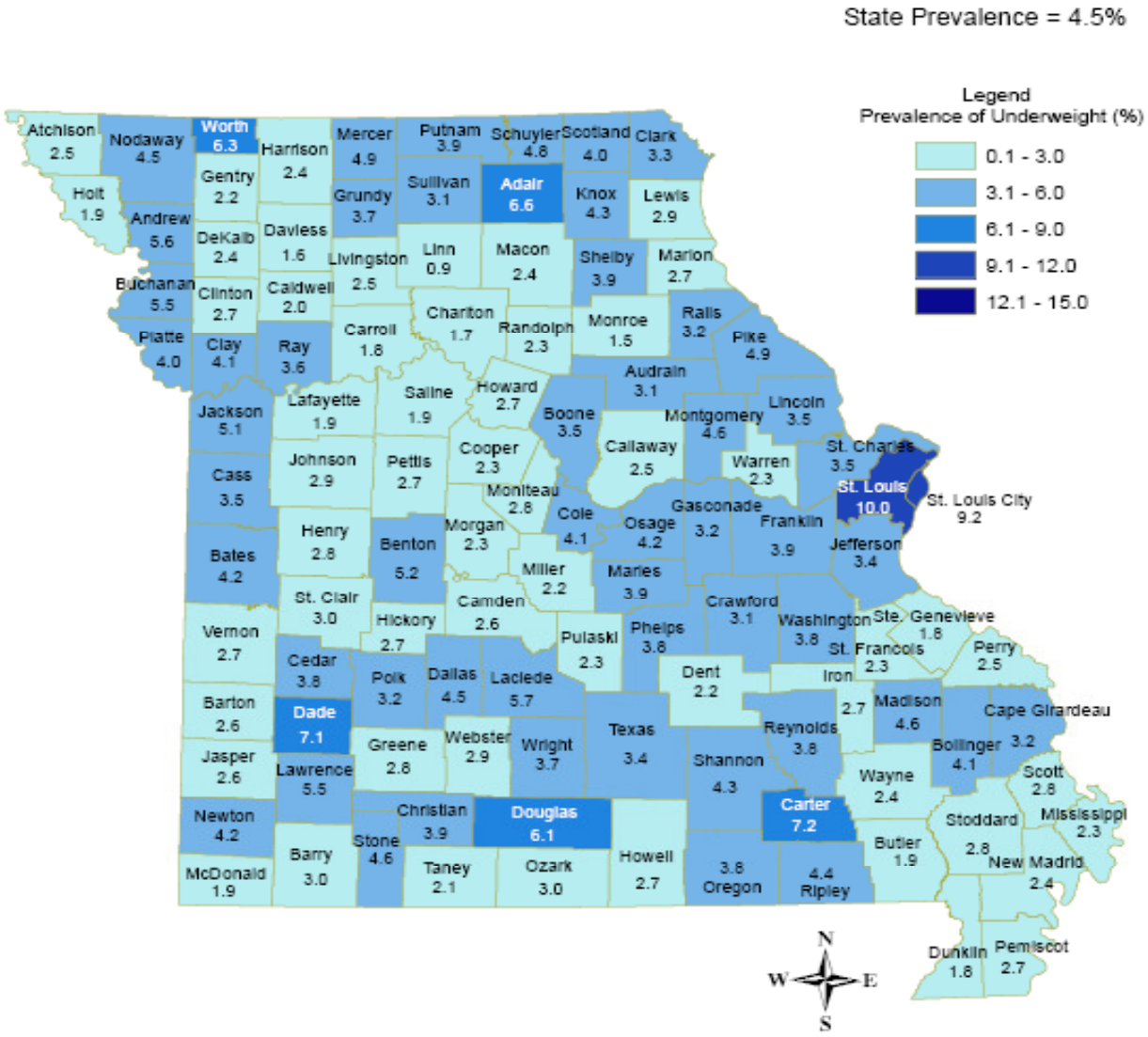
Appendix 3

Prevalence of Short Stature by County, Missouri PedNSS 2003-2005 Combined Years



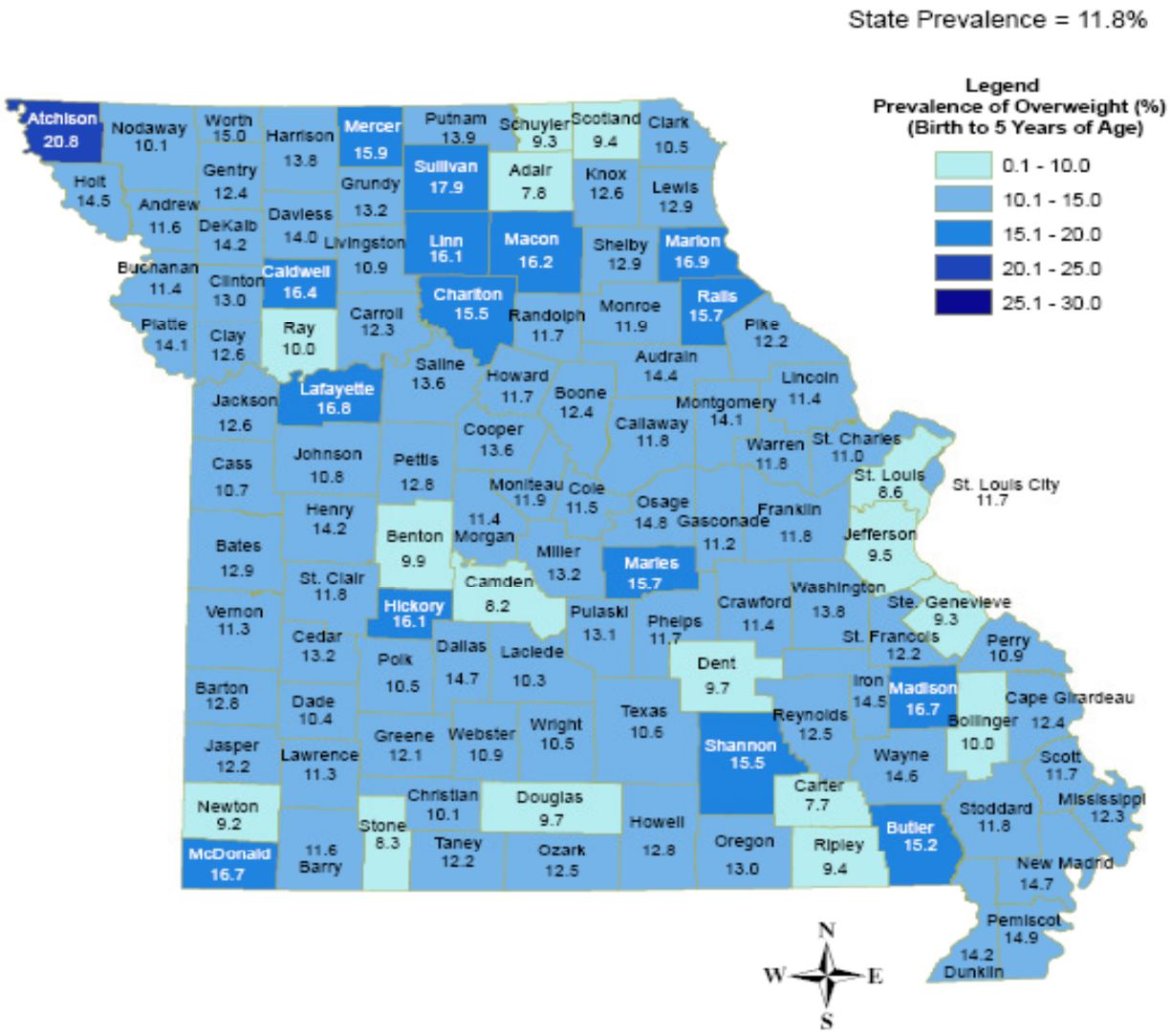
Appendix 4

Prevalence of Underweight by County, Missouri PedNSS 2003-2005 Combined Years



Appendix 5

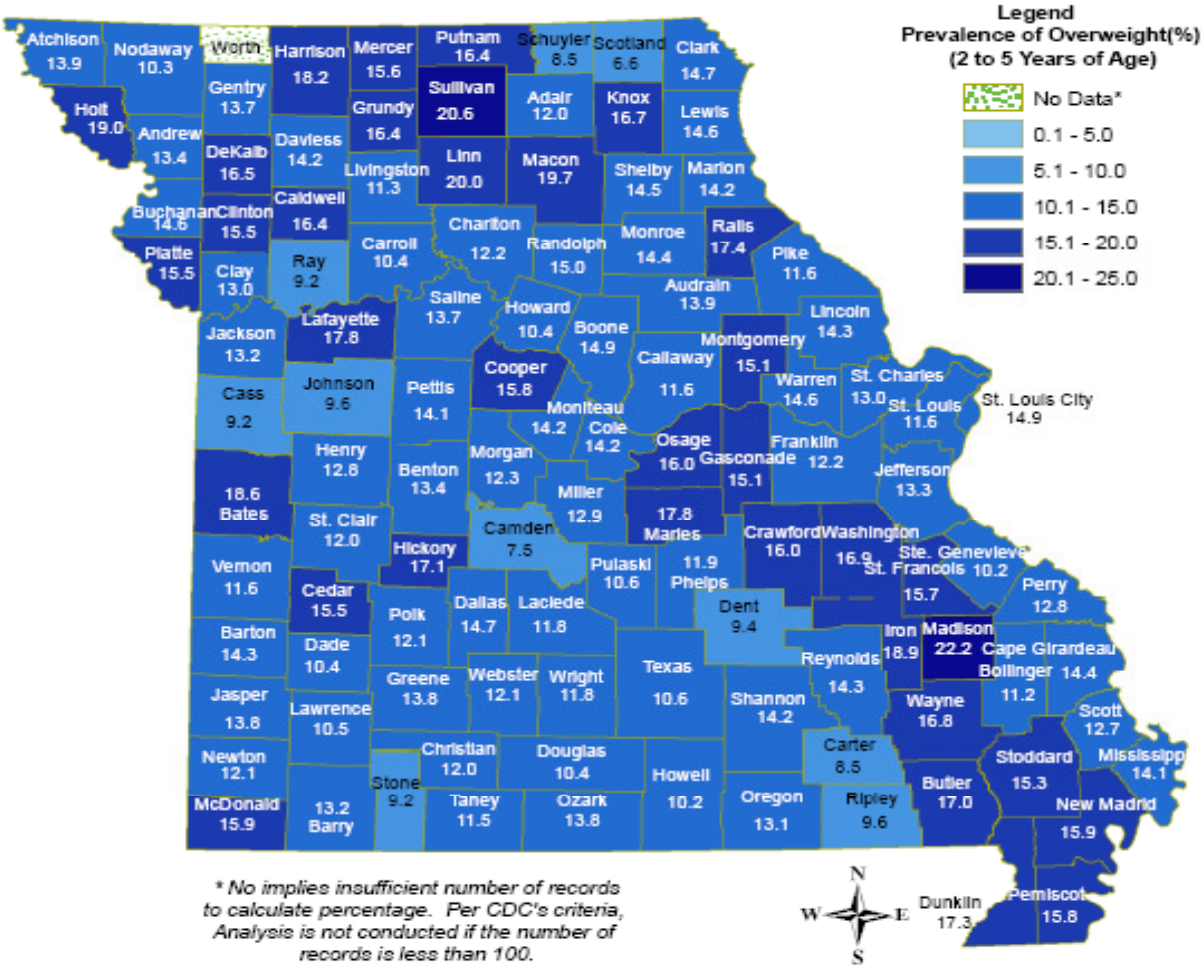
Prevalence of Overweight (Birth to 5 Years of Age) by County, Missouri PedNSS 2003-2005 Combined Years



Appendix 6

Prevalence of Overweight (2-5 Years of Age) by County, Missouri PedNSS 2003-2005 Combined Years

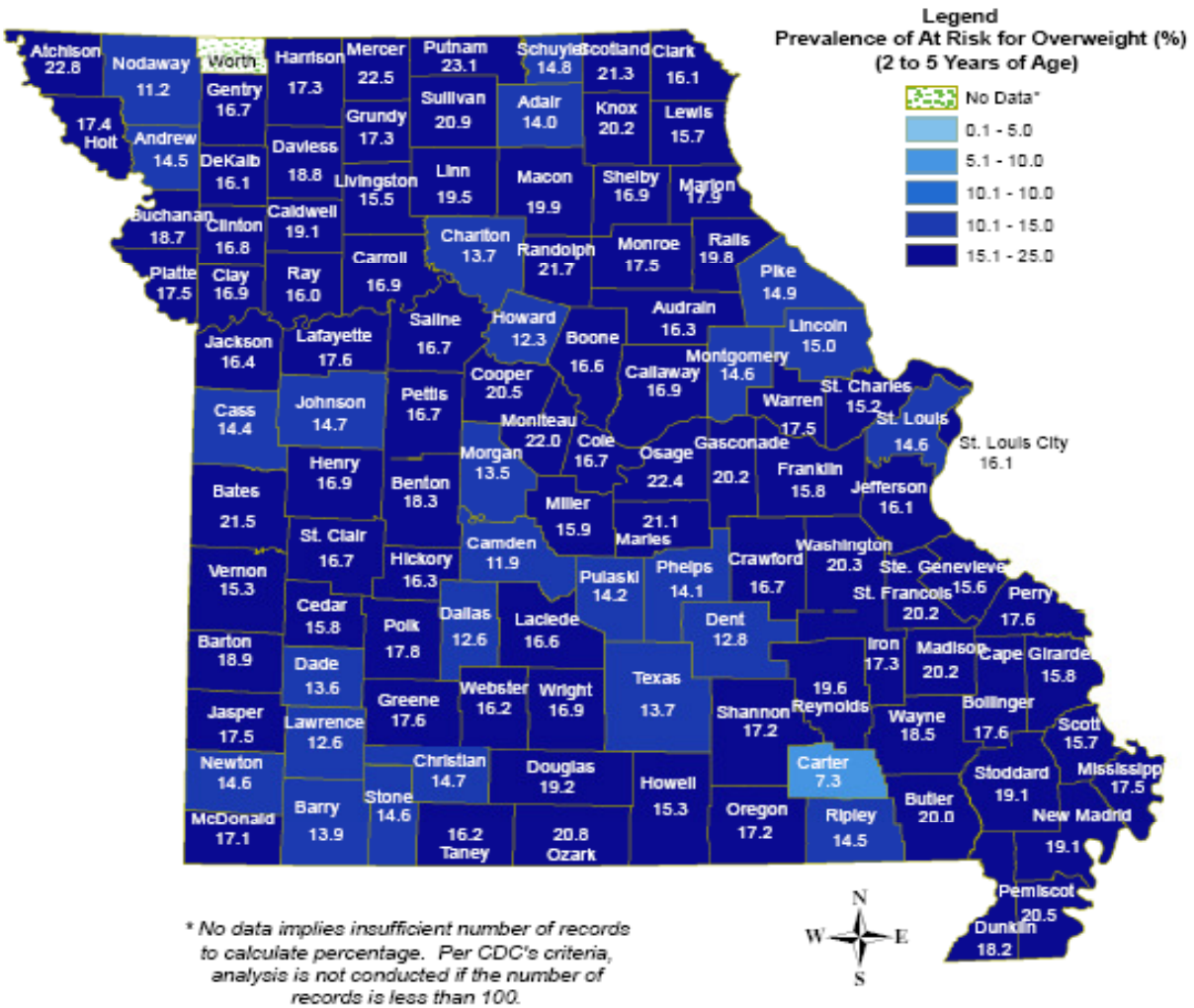
State Prevalence = 13.4%



Appendix 7

Prevalence of At Risk for Overweight (2-5 Years of Age) by County, Missouri PedNSS 2003-2005 Combined Years

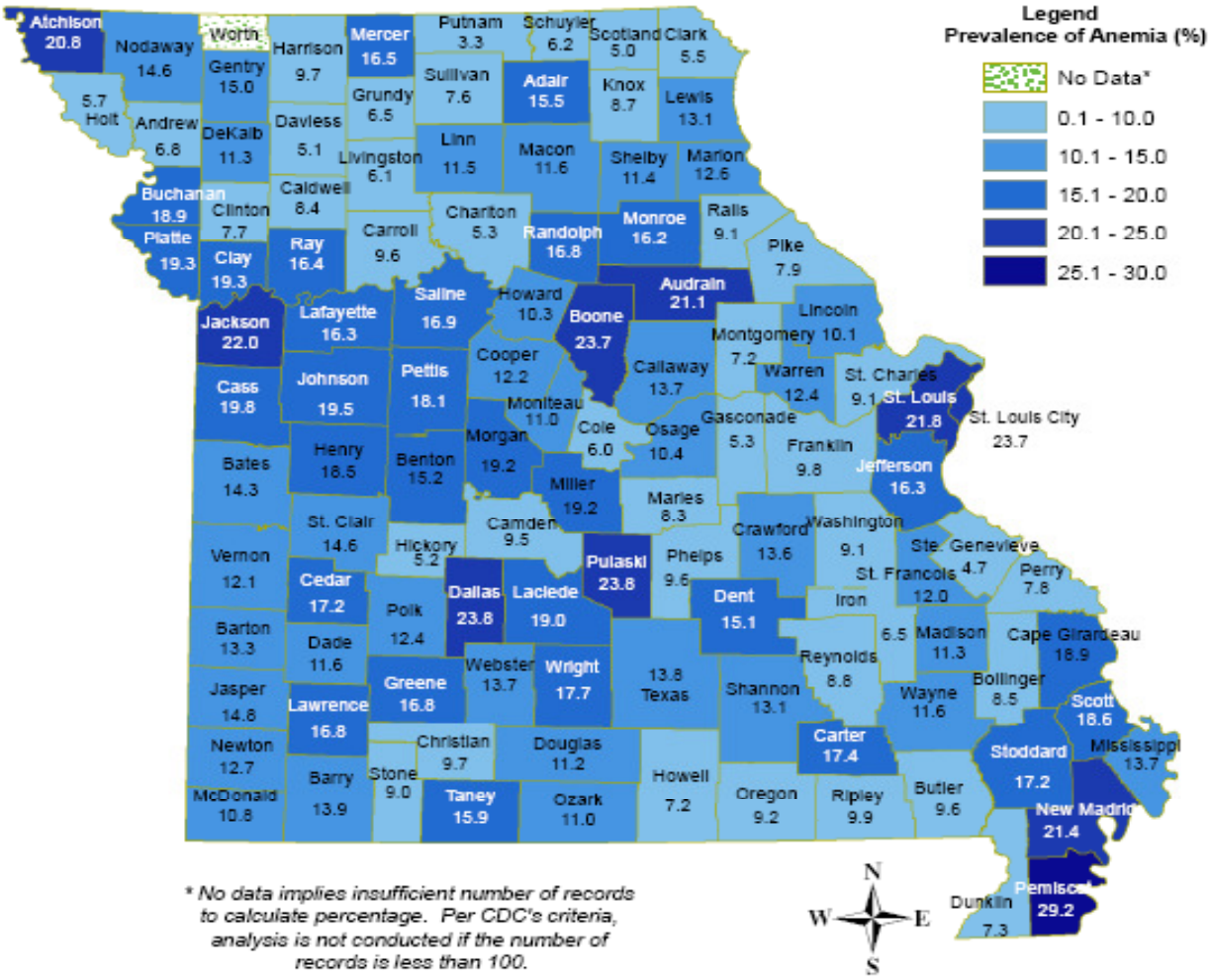
State Pervalence = 16.7%



Appendix 8

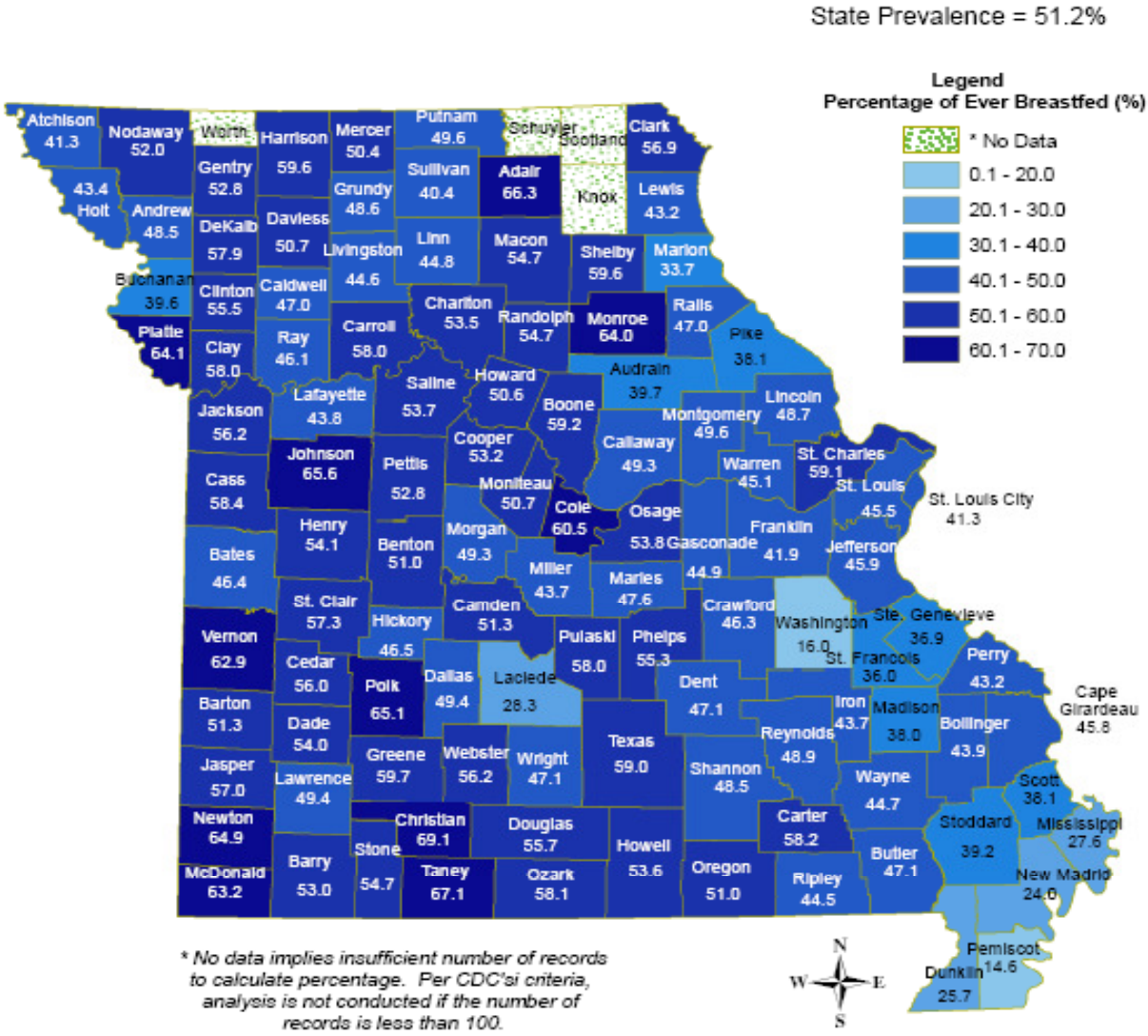
Prevalence of Anemia by County, Missouri PedNSS 2003-2005 Combined Years

State Prevalence = 17.5%



Appendix 9

Percentage of Infants Who Were Ever Breastfed by County, Missouri PedNSS 2003-2005 Combined Years



** No data implies insufficient number of records to calculate percentage. Per CDC'si criteria, analysis is not conducted if the number of records is less than 100.*